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A Nature Wooing

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THE CABIN AT MISENER'S LANDING ON THE TOMOKA.

Showing tufts of gray Spanish moss dangling from the limbs of a live oak tree.

A NATURE WOOING

AT

ORMOND BY THE SEA

BY

W. S. BLATCHLEY

Author of "Gleanings From Nature"

"The morning wind forever blows, the poem of creation is uninterrupted; but few are the ears that hear it."

—*Thoreau.*

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To the thousands of tourists who, each winter, seek the shelter of the sunny skies and the companionship of the roaring surf at "Ormond by the Sea" this volume is inscribed, with the hope that in the minds of some of them it may engender an acquaintance with and a friendship for some of the more lowly forms which there abound.

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PREFACE.

"Go South and rest for a month or two." Thus my physician spoke in the late winter of 1898-'99, when I was suffering from a severe attack of nervous prostration. Southward I went, but my rest was mainly taken in the great hospital of Nature—the woods and fields of the region where I sojourned. There I jotted down facts and fancies concerning the animals and plants about me. There, at times, I indulged in reveries on other subjects, which, too, were scribbled in my daily note book. These I have incorporated, for the most part just as they were then written, in this little volume.

With my own thoughts I have combined many statements from others regarding the objects which I observed. These are mainly from the works of Bartram, Michaux, Say and other naturalists and travelers of nearly a century ago. Their books are becoming scarce, but the objects of which they wrote still abound and can be seen or heard by almost any visitor to the sunny southland who has an open eye and an ear atune with nature.

The book will, I trust, add something to what is known of the geographical distribution of many of

nature's objects mentioned therein, and may also aid in preserving from oblivion some of the thoughts and facts recorded of those objects by the observers of old.

At a casual glance, the book may seem scientific and technical in nature, owing to the large number of Latin names used. These are, however, printed in italics and may be readily passed over without losing any part of the connection, since they are almost always accompanied by the common name of the plant or animal to which they refer. Aside from these Latin names, it is believed that no portion of the book will be found unintelligible to the ordinary reader.

Indianapolis, Ind., October 1, 1902.

"My heart is fixed firm and stable in the belief that ultimately the sunshine and the summer, the flowers and the azure sky, shall become, as it were, interwoven into man's existence. He shall take from all their beauty and enjoy their glory."—*Jeffries.*

"I prefer an oak tree to a temple; grass to a brick pavement; wild flowers beneath a blue sky to exotic orchids under glass. I would walk where I do not risk being jostled, and, if I see fit to swing my arms, leap a ditch or climb a tree, I want no gaping crowd, when I do so, to hedge me in. In short, I prefer living 'next neighbor to Nature.'"—*C. C. Abbott.*

"I wish so to live ever as to derive my satisfactions and inspirations from the commonest events, every day phenomena, so that what my senses hourly perceive in my daily walk may inspire me, and I may dream of no heaven but that which lies about me."—*Thoreau.*

SOUTHWARD BOUND.

"The man who goes alone can start to-day; but he who travels with another must wait till that other is ready, and it may be a long time before they get off."—*Thoreau.*

March 3, 1899.—This morning I leave Louisville, Kentucky, southward bound, seeking, as did Ponce de Leon, renewed health and vigor in the "Land of Flowers." A heavy mist at first veils everything from view. Occasionally it lifts for a few rods back from the railway, and I see a clump of Kentucky coffee trees, *Gymnocladus dioica* L., still bearing their last year's crop of thick, chocolate brown pods; or, perchance, the curly head and ebony face of a smiling pickaninny gleams for an instant through the mist, which quickly settles down about him as the train rushes on.

I change my title twice within twenty minutes. The Pullman conductor, as he collects my berth fare, dubs me "Captain." He hails from St. Louis, where captains are plentiful on the Mississippi River boats. Shortly comes along the regular train conductor, a portly gentleman from Louisville. True to his Kentucky instinct, he calls me "Colonel." I am not possessed of that universal accompaniment of a Ken-

tucky Colonel, a bottle of moonshine or old Bourbon whiskey, but I have the next thing to it, a flask of Burgundy wine, so here's to the health of the train conductor who raised my rank on first sight. Long may he live and prosper! At the present rate of promotion I shall be a Major-General many hours before I reach my destination.

Beyond Lawrenceburgh, a short distance, the hills or bluffs of the Kentucky River appear, clad in the evergreen of the cedar and the pine. We cross the river on Young's High Bridge and soon reach Lexington, the second city in Kentucky—the home of Henry Clay and the Breckenridges—the heart of the famous blue-grass region—renowned to-day among the élite of this land of ours for its handsome women, its famous race-track, its noted stud-farms. Among men of letters a century ago, it was known chiefly as being the seat of Transylvania University, then the most celebrated school of learning beyond the Alleghanies, but destined soon to be overshadowed by many which sprang into existence in Kentucky's sister states.

To naturalists, Lexington is chiefly interesting for its having been for a term of years the abiding place of that unique member of their ilk, Constantine Samuel Rafinesque. Here he wrote his "Ichthyologia Ohioensis," over which students of the finny tribe puzzled for 50 years. Only recently have Rafinesque's genera and species, as characterized in that

work, received their just recognition. Indeed, had not David S. Jordan, with his discerning eye and clear judgment, identified the species from the scanty descriptions of the "Ichthyologia," and then, contrary to the wishes of many ichthyologists, claimed for the author, in accordance with the rules of zoölogical nomenclature, his just deserts, much of Rafinesque's work would have been buried in oblivion.

One sees but little of Lexington from the train. The Louisville & Cincinnati divisions of the Southern Railway merge at this point, and a motley crowd of tourists, seeking also the sunshine of the southland, come into the sleeper and put an end to the quiet which, up to this time, I have enjoyed. Between Lexington and Danville the road runs for the most of the way through a limestone region. About Danville the country is especially fine. A few warm days have put new vigor into the blue-grass, and the tiny rootlets have begun to suck up the nourishment yielded during the winter by the disintegrating limestone. Far and wide the pastures spread, covered with that faint green tinge which appears in a blue-grass region as one of the foremost harbingers of the coming springtime. Prince among our native grasses this—aye, more than prince—the king, the ruler of them all—surpassing all others in beauty and gracefulness of culm, as well as in its value to the owner of the land. James Lane Allen, writing of it, per-

haps of that growing on these very slopes, has called it a "hardy, kindly, beautiful, nourishing stock; loving rich lands and apt to find out where they lie; uprooting inferior aborigines, but stoutly defending its new domain against all invaders; paying taxes well, with profits to boot; thriving best in temperate latitude and checkered sunshine; benevolent to flocks and herds; and allying itself closely to the history of any people whose content lies in simple plenty and habitual peace—the perfect squire-and-yeoman type of grasses."*

Before reaching Burgin we cross once again the Kentucky River at another High Bridge. The bluffs of this river, wherever I have seen it, are very high and precipitous, forming the walls of a rocky gorge which the onflowing waters during hundreds of centuries have slowly eroded in the soft limestone of this region. The scenery about High Bridge is wild and picturesque, and for a distance the railway resembles a great serpent, winding in and out as it follows the bends of the stream; its bed having been carved out of the solid rock along the side of the bluff.

Fig. 1—Chipmunk.

*The Blue Grass Region of Kentucky, p. 1.

The fences of this portion of Kentucky are mostly of stone, gray, lichen covered, and seemingly capable of withstanding the elements for centuries. At one point I note a chipmunk, *Tamias striatus* L., seated on his haunches on top of one of these fences within a rod of the fast moving train. The first of March sees him abroad here—the first or middle of April in central Indiana. I can almost hear his scolding "tchwk—tchwk" as the train dashes past him.

About McKinney and South Fork, in Lincoln County, we first strike the scrub oak thickets, which mark the passage from the limestone region into one of sandstone or mixture of lime and sand. The soil for many miles thereafter is red with a superabundance of iron oxide, and so poor and rocky that one would have difficulty in raising a disturbance upon it, unless a little leaven or fertilizer of "moonshine" was present to serve as a starter.

Just before reaching Waynesburg, we strike the foothills of the Cumberland Mountains, and the railway passes through the first of the twenty-seven tunnels which it was necessary to cut through the ridges along its line. This is King's Tunnel—said to be one and a half miles in length. Crossing the Cumberland River at Burnside, the railway winds on through tunnel after tunnel and down valley after valley, until Harriman, Tennessee, is reached. This is a boom town, which stands out prominently on the hills, two or three miles to the left of the main line of the Southern.

Below Harriman the railway runs southwesterly, following the valley of the Tennessee River for 70 miles to Chattanooga. On the right for this entire distance that grand escarpment of the Cumberland Mountains, known as Walden Ridge, rises precipitously a thousand feet or more in one unbroken line. To a person coming from the level plains of Central Indiana, how high, how grand seems its summit, gleaming in the bright spring sunshine! In a level country 'tis hard at times for the naturalist to bring his thoughts above the level of the sward. But with hills about—gray lichen covered cliffs of limestone or sandstone to feast the eyes upon—with waters babbling o'er their stony bed or falling in sheet-like form from the ledges above—one is inspired with new thoughts and enstrengthened with new ambitions. The hills lift up the human soul just in proportion as they lift their pinnacles toward the skies. No man from a land of level sward e'er saw for the first time a mountain peak pierce the clouds without being bettered by the sight. New thoughts, new hopes, new resolves are engendered within him by this glimpse of a portion of his mother earth rising so far above him. Heretofore he has trodden her easily beneath his feet—has felt himself master of her domain because he has been above her. Now he sees her towering in inaccessible cliffs far beyond his reach. A feeling of her greatness begins, for the first time, perchance, to force itself upon

him. He sees new worlds unconquered; he dreams of conquering them; and with this dream new seeds of resolve, of ambition, of manfulness, are sown within his soul. It may be months—aye, years—before these seeds begin to germinate, but they are there, and the proper environments and opportunities will sometime cause them to make their presence known.

I sit for an hour or more on the rear end of the observation car drinking in the beauty of this valley of the Tennessee. As we proceed southward the signs of spring become more numerous. After passing Dayton, the music of the frogs' full chorus comes to my ear for the first time this season, and thereafter, wherever the train stops in the vicinity of water, it is the prevailing sound. As the last rays of the day's sunlight glisten and sparkle in reflection from the crests of the cliffs of Lookout Mountain, the train enters Chattanooga. 'Tis a city famous in the annals of war—once ravaged and desolated by contending armies, now thriving and populous—its 35,000 citizens enjoying that peace, plenty and prosperity which has come as the aftermath to the long struggle of two score years ago. From the car window the city appears to be scattered over much space, and the houses old and begrimed with smoke, but, as in most other cities, the railway probably passes through the least pleasing portion. As we leave its environs the curtain of darkness lowers and the observations of the day are at an end.

March 4, 1899.—Morning breaks with the hills all behind us and the swamps of Georgia surrounding us on every side. The train stops with a sudden jerk which arouses me. The first sound which greets my ear is the trumpeting note of the festive bull-frog. Looking out, I see a waste of water; low, shrubby pine trees; flat, wet miasmatic land. Thus it continues for an hour or more, when Everett is reached. It is in Glynn County, near the southeastern border of the State. On the map in the folder of the railway company the name appears in bold faced type, the place being a crossing of two railways. From this I was led to expect a town of some size, but a glance through the haze of the early morn shows only fifteen or twenty rude frame houses, a railway station and stock pens; the latter presumably for aid in loading and shipping the famous razor-backed hogs, which I here see for the first time.

Below Everett a few miles the first specimens of that striking, semi-tropical growth, the cabbage palmetto, *Sabal palmetto* R. & S., appear. It occurs in low ground near the coast, from the mouth of Cape Fear River, North Carolina, southward to Florida, and along both sides of that peninsula as far westward as the Appalachicola River. Occasionally, especially along the inlets and larger streams, it is found back thirty to fifty miles from the sea. Possessing a trunk twenty to forty feet in height, of a uniform diameter throughout, and without a branch

or other appendage save a loose, globular crown of large palmated leaves, it is one of the most beautiful and majestic members of our southern flora. The leaves, when fully expanded, are of a brilliant green with petioles two feet or more in length and palmate blades varying from three to five feet in breadth. They are so arranged that the smallest occupy the center of the summit and the largest the circumference. The stem increases in height only by the growth of the terminal bud, and before the leaves develop they are folded like a fan. As the older leaves die and drop away, the bases of their petioles and their sheaths form a protuberance about the base of the crown; the sheaths in time being dissolved into a network of brown interlaced fibers.

In the words of Michaux, the base of the unopened bundle of leaves "is white, compact and tender; it is eaten with oil and vinegar, and resembles the artichoke and the cabbage in taste, whence is derived the name of 'cabbage tree.' But to destroy a vegetable which has been a century in growing, to obtain three or four ounces of a substance neither richly nutritious nor peculiarly agreeable to the palate, would be pardonable only in a desert which was destined to remain uninhabited for ages. With similar prodigality of the works of nature, the first settlers of Kentucky killed the buffalo, an animal weighing twelve or fifteen hundred pounds, for the pleasure of eat-

ing its tongue, and abandoned the carcass to the beasts of the wilderness."*

The palmetto, however, has outlasted the buffalo, and bids fair to thrive for centuries yet to come in the waste lands along our southern coast. Like other palms, it is a true endogen, its trunk being composed

Fig. 2—Carrion Crow.

of bundles of elongated woody fibers. It is of no account as fuel, being very soft, porous and full of sap, and therefore decaying before it dries sufficiently to burn. Its main use is in the construction of piles, wharves, etc., as it is impervious to the attack of the ship worm, *Teredo navalis* L., and very durable under water.

* N. Am. Sylva, 1819, III, p. 2.

Coincident with the appearance of the first palmetto is that of another semi-tropical form, though this time winged, namely, the black vulture or carrion crow, *Catharista atrata* Bartram. In recent years the known range of this vulture has gradually extended northward, until now it is recorded as a resident in small numbers in southern Ohio and Indiana.* In the south it is everywhere abundant and, being a voracious and indiscriminate feeder on carrion and all sorts of animal refuse, it is an efficient and almost indispensable scavenger. In the vicinity of all southern cities it is very tame, perching in flocks on the roofs, fences and trees, and fearlessly swooping down in the streets and alleys upon any object which presents the appearance of animal offal.

In southern Georgia and all of Florida the railways are ballasted with sand. The engines burn pine wood instead of coal. As a consequence the flakes of soot and burning cinders are large and abundant. Fires alongside the railway are very common. Since all bridges, except those across the largest streams, are of wood supported by piles, the burning of some one of them is of common occurrence, and traffic is thereby oftentimes much delayed. From the sand ballast, and from the sandy plains over which the roads, for the most part, pass, arises a fine dust, which, mixed with the cinders, finds its way through car windows and doors and settles over everything

**Vide* Twenty-second Annual Report, Department of Geology and Natural Resources of Indiana, 1897, p. 768.

within. The railway fare upon all the roads in Florida is four cents per mile.

The towns from Everett to Jacksonville are all small, apparently pioneer affairs, started when the railway was built, upon small clearings in a primeval wilderness. For most of the way the soil of the upland appears to be a very thin coating of organic matter resting on a bed of white sand. The long-leaved pine, *Pinus palustris* Mill., and two or three species of wire grass, *Aristida*, form ninety per cent. or more of the vegetation of these so-called "pine-barrens." The pines are almost all second growth, and in many places are being used for turpentine production. Occasionally one sees a giant, rising far above its fellows, with long festoons of gray Spanish moss, *Tillandsia usneoides* L., dangling from its outstretched limbs. These are the solitary sentinels of the original pine forest, now standing guard, as it were, over the younger generation. Their companions have long since fallen before the axes of the lumbermen, who invaded all this district adjacent to the railway as soon as the latter was completed. About the borders of the pine-barrens and in the marshes the vegetation is much more dense and the number of species of shrubs and trees very large.

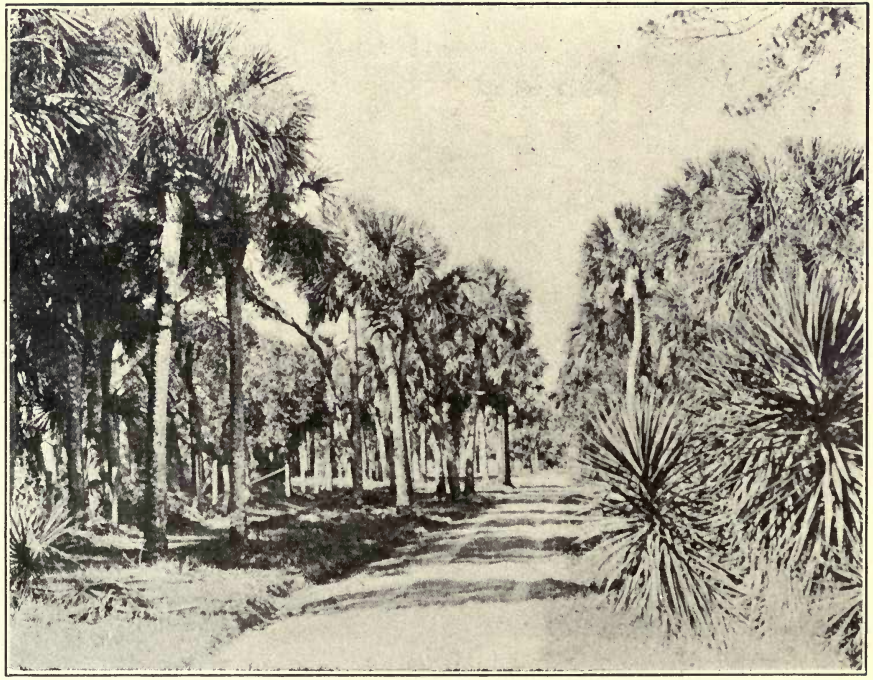
Crossing the St. Mary's River, a sluggish, lagoon-like stream about one thousand feet in width, we enter Florida—land of our hopes and dreams—and of the hopes and dreams of thousands of other tourists

who visit it each year in search of health or pleasure. The same scenery continues. In places the land is higher, the long-leaved pines larger, the underbrush of the marshes more cleared away. Where they are loading pine logs on the cars we note that four to eight mules are hitched to a cart, the wheels of which are ten feet in diameter. Suspended from the axle of the cart is a kind of grappling hook or clamp, which clasps the log in its iron embrace. The log is then dragged across the barren and along the roads to the point of loading.

We arrive at Jacksonville at 9:30 o'clock a. m., an hour late. The railway station is in the outskirts of the city and we see but little of the latter, as we have to hurry on board the train for St. Augustine and the south, which has waited for us. This train belongs to what is known as the Florida East Coast System, which, together with the Plant System, controls all the railways of Florida. The main line of the East Coast System extends from Jacksonville to Miami, a distance of 366 miles, the railway lying parallel to and but a mile or two distant from the Atlantic, throughout the greater portion of its length.

Jacksonville, the metropolis of Florida, and the point to which all tourists are ticketed, is a city of 30,000 population, located on the St. John's River, some twenty miles from its mouth. My destination is Ormond, a town on the Atlantic coast, 105 miles below Jacksonville. On the way the railway passes

St. Augustine, the first European settlement in the United States, and the most noted place in the history of Florida. I see little of it, however, for I am seeking not the history of man's past, not his society in the present, but health and a knowledge of some of nature's object which dwell in this sunny southern clime.



A Portion of the Main Street of Ormond.

The houses have wide lawns intervening between them and the Cabbage Palmettos.

AT ORMOND BY THE SEA.

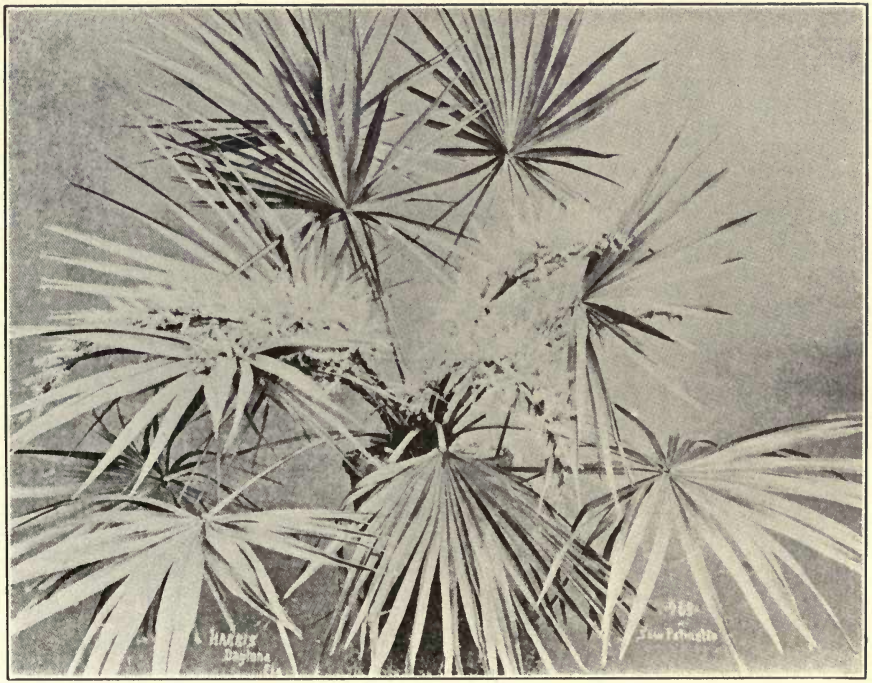
"They were pleasant spring days in which the winter of man's discontent was thawing as well as the earth, and the life that had lain torpid began to stretch itself."—*Thoreau.*

We reach Ormond at one o'clock p. m., and I am met at the station, a third of a mile from the town, by Mr. Harrison Bristol, a gentleman who is expecting me. A tram-car, the motive power of which is one blind horse, is waiting for passengers. The driver to-day is an elegantly dressed lady, probably one of the guests of the Ormond Hotel, the great inn a mile distant, between which and the railway station the single tram-car runs. She keeps the horse a-jogging by clucking and striking him with the lines, while the conductor collects the fares.

Ormond is a pleasant town of 600 population, a large proportion of the dwellings being the winter cottages of northern residents. Its main, and practically its only, street runs north and south and is nearly a mile in length. Along the western side of this the houses are scattered, facing the Halifax River, a tide-water stream, or rather elongated bay, the mouth of which, Mosquito Inlet, opens into the Atlantic seventeen miles below. Opposite the town

the river is nearly half a mile wide. On its farther side is a long peninsula or narrow stretch of land, a third to a half mile in width, on the eastern side of which is the beach line of the Atlantic. This peninsula extends from Mosquito Inlet northward to Harwood, five miles above Ormond, where it unites with the main land. A substantial bridge crosses the river at Ormond, and at its eastern end, or on the east bank of the Halifax opposite the town, is the Ormond Hotel, one of the famous hostelries owned and operated by the East Florida Railway Company. At the hotel the prices range from $5 per day upward, so I content myself with a room in the modest cottage of Mr. Bristol, in the town proper, and arrange for meals at a nearby boarding house.

An unusually heavy frost, a few weeks before my arrival, killed many fruit trees and all the early vegetables. The bay trees, magnolias, cabbage palmettos and other shrubs and trees indigenous to the region have withstood its blighting touch, and the semi-tropical aspect given to vegetation by their foliage is delightful to one just from the north where all is yet brown and sere. Peach trees are in full blossom, and the fragrance of the flowers of the yellow jessamine is most pleasing. The songs, chirps and calls of mocking birds, chewinks, brown thrushes, blue jays and crows, greet me on every side. The sounds and odors of May 10th or thereabouts in central Indiana surround me.



THE SAW PALMETTO.

After removing some of the dust and grime of travel, refreshing the inner man and disposing of my baggage, I set out northward on a short tour of exploration. The houses, for the most part, are on large lots, and possess extensive lawns filled with shrubbery and flowers. At the end of the street the roadway enters at once the unfenced forest and continues thus for miles northward. These woods bordering the river, as well as all others which afterward came to my notice, excepting the pine-barrens, are not clear and open like most of those in the northern states, but are so filled with tropical undergrowth that one can scarcely force his way through them. Fully eighty per cent. of this undergrowth in the vicinity of Ormond is composed of the saw palmetto, *Serenoa serrulata* Hook. Its creeping stem branches and ramifies in every direction just beneath the surface. The large, circular, fan-shaped leaves, with many sharp teeth along the edges of their petioles, rise at short intervals from the joints of the underground stem and reach a height of two to four feet. Their teeth clutch and tear at one's clothing at every onward step. Covering, as the leaves do, almost every square foot of surface, they present a most formidable obstacle to persons desiring to penetrate the forest. These leaves have a strong fiber and their blades are used in filling mattresses. The flowers furnish fine bee pasturage. The root is said to be rich in tannin; while the black drupes or berries,

three-fourths of an inch in length, are gathered in quantity by the natives and sold to parties who use them in the preparation of medicine. They are said also to be a favorite food of bears.

About the only animal form which I note on this initial trip is a chamæleon, *Anolis carolinensis* Cuv., on the under surface of one of the leaves of the saw palmettto, his hue as bright a green as that of his resting place. I watch him a short time, and he, in turn, blinks and stares at me. His agility finally saves him from a consignment to my alcohol bottle, and I turn backward as the dusk of the coming night settles around me.

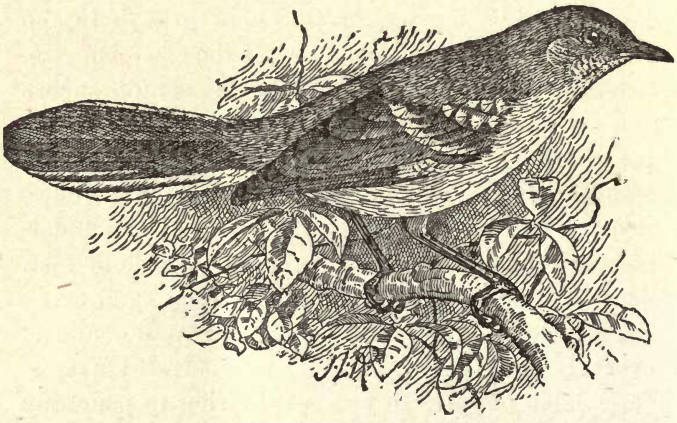


Fig. 3—Southern Mocking-bird.
(After Judd.)

March 5, 1899.—The Sabbath morn breaks cloudy and sultry, and about seven o'clock the rain begins to

fall heavily, preventing that out-door exercise which I so badly need. The song of the brown thrush and the southern mocking bird are the sounds which are first impressed upon my awakening senses. Mingled with them is the loud "char"-"char" of the zebra woodpecker, *Melanerpes carolinus* L. Yellowhammers or flickers are also abundant, and their cackle is heard incessantly; not "on the hillsides," as noted by Thoreau, for there are no hills, but seemingly everywhere in the early morn.

On my way to breakfast I note a gray squirrel, *Sciurus carolinensis* Gmelin, frisking and jumping along the fence of an unused town lot. It is a third smaller, and has its upper surface more varied with tawny or yellowish brown, than the northern variety, *leucotis*. This is the only truly arboreal squirrel found near Ormond, and is very common hereabouts according to the statement of mine host.

A flock of crows numbering a hundred or more settle, as I write, in the pines along the river bank and on the remains of the old pier jutting out into the stream. They utter at intervals a peculiar low, short croak resembling the syllables "kah," "kah." This differs much from the more prolonged, harsher "c-a-w" of their northern brethren. It may be that some fish crows, *Corvus ossifragus* Wilson, mingle with the common *Corvus americanus* and utter the short, soft call. It is impossible to determine this without specimens in hand. As the rain begins to

fall the entire flock rapidly departs for the shelter of the woodland.

Soon after noon the rain ceases and I start once more along the roadway northward, my destination being a large shell mound about a mile from the center of the town, over the slope of which the road passes. From this mound has been obtained for years the material for the sidewalks of Ormond. It is located within a few rods of the Halifax River, and covers an area 1,136 feet in length; the width varying from 144 to 362 feet. The greatest thickness or height above the surrounding plain is ten feet. The soil covering the surface of the mound is very rich, and on it grow many magnificent specimens of cabbage palmettos, live oaks and other trees. It is a kitchen midden, or refuse heap of some ancient people, composed of a number of species of shells, pieces of pottery, bones of various animals, ashes, charcoal, etc. I shall make many pilgrimages to it during my stay and will give a detailed description of it hereafter. The above facts are mentioned in this connection in order that the reader may know something of its character when reference is made to it on the pages which follow.

On my way to and from the mound this afternoon I make a number of side excursions a short distance into the woods on either side of the roadway. From beneath some chunks of decaying palmetto, I secure several specimens of a very large myriapod. A pine

log yields a few small beetles of the family *Histeridae*, and its stump, when the loose bark is pulled away, reveals a number of large wingless cockroaches, most of which were dead, probably from the effects of the recent frost. They are afterwards identified as *Eurycotis ingens* Scudder — the largest and most ill-smelling blattid I have ever collected. Two scorpions, a number of minute pseudo-scorpions, *Chelifer muricatus* Say, and several examples of an earwig, *Labia burgessi* Scudd., are secured beneath the bark of the same stump.

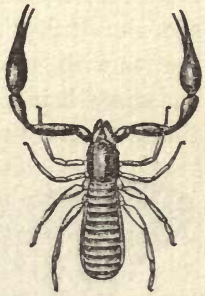


Fig. 4—A Pseudo-scorpion.
(Greatly enlarged.)

The young of a very slender bodied brown grasshopper, *Rhadinotatum brevipenne* Thos., are found to be frequent on the scattering sedges and grasses in such small open places as are bare of the saw palmetto. A single butterfly, flitting along the road close to the ground, is netted and found to be an old acquaintance, *Eudamus pylades* Scudder, the dusky wing. With the exception of six or seven small hyaline white spots arranged in three groups on each fore-wing, it is a uniform dark brown in color. The antennæ are spindle-shaped, with the apical half more slender and bent abruptly downward. The wing expanse is one and a half inches. It is quite common

in the northern states in June and July, the larvæ feeding on clover and allied plants. I afterward took a number of additional specimens near Ormond.

March 6, 1899.—The morning dawns clear and cool. I spend the forenoon entomologizing, following a forest roadway in its many turns. Dragonflies are plentiful, *Tramea carolina* L., a medium sized species with large brown spots on the base of the secondaries, being exceedingly so. Next to this in abundance is *Anax junius* Drury, a large form with

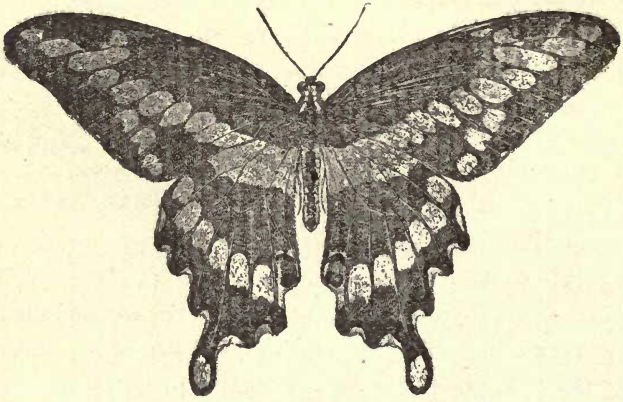


Fig. 5—The Giant Swallow-tail.
***Papilio cresphontes* Cram.**
(Three-fifths natural size.)

head and thorax grass green. Darting hither and thither in the bright March sunshine, they are this morning the most brilliant creatures of the air on the wing.

Among the butterflies, *Papilio turnus* L. and *P. cresphontes* Cram. are seen, but escape the net. Three species are captured, viz., *Papilio troilus* L., *Agraulis vanillæ* L., and a small earth-loving form, *Neonympha sosybius* Fab. From other members of its group it is known by its being a uniform wood brown above, while below the wings are crossed by two narrow reddish brown lines. Near the hind border of the under side of the fore-wings are one or two black eye spots ringed with yellow and pupilled with pale blue, and each hind wing bears two or three similar spots. Like all others of its genus it is a woodland sprite, flitting ever close to Mother Earth in ceaseless, restless flight.

Three species of locusts are noted. One, *Schistocerca americana* Drury, common in the north, flew with prolonged zigzag flight into the top of an osage-orange tree where, like a squirrel, it dodged around the side of the branch when approached, and so escaped the net. Two specimens of *Arphia granulata* Sauss. and several of a sharp-headed, brown-bodied form, *Amblytropidia occidentalis* Sauss., were secured.

In the afternoon a strong, cold wind blows from the west. I cross the river and the peninsula beyond to the ocean's beach. Before me the Atlantic stretches eastward, blue and unbroken to the shores of Africa. The wind blows off shore, and except for the sight and roar of the surf I would not know the

sea was there. No odor of salt water, no sign of seaweed greets me. The beach is a hard, unbroken mass of reddish yellow sand, with only here and there the valve of a sea shell or the body of a giant sea squid to break its monotony. Not a pebble, not a sign of fish, not a rock for the waves to dash upon; how different from the beach of the same ocean along New England's rock-bound coast!

The ever-present fish hawks, *Pandion haliætus* L., great, unwieldy bodied birds, fly in pairs, close down to the incoming surf, seeking with eagle eye a supper in its depths. Flocks of a curious little "shore walker" or sand piper follow in a peculiar running gait every retreating wave; then turn about and retreat as rapidly before each advancing one.

A solitary steamer of small size, southward bound, about half a mile from shore, is the only vessel in sight. After an hour the whole scene becomes monotonous in the extreme and, on account of the sharp wind which catches up and carries outward clouds of sand from the inner edge of the beach, very disagreeable.

March 7, 1899.—This morning the mercury marks the freezing point, and the same wind, cold and disagreeable, blows from the northwest. I wear an overcoat to breakfast, and at nine o'clock don it again and start forth in search of insects. In a deserted orange grove, where the dead, thorny snags of former prosperous growing trees are sad evidence of the

frosts of the past few winters, I spend most of the time till noon. The hardened, spine clad involucres of last season's sand burs, *Cenchrus tribuloides* L., are very numerous and give me much trouble by adhering to the net every time I sweep it close to the ground. From the dunes along Lake Michigan to the sandy plains of south Florida this weed produces its annual crop of troublesome armored involucres. Linnæus must have pricked his finger with one of its barbed spines when he called it *tribuloides*. 'Tis well named, being a tribulation, indeed, to barefooted boys and butterfly hunters.

As on yesterday, three or four species of dragonflies are plentiful. Five specimens of one small, dark brown form, *Diplacodes minuscula* Ramb., are captured close to the ground from stems of weeds and grass on which they alight. The others fly too high and too swiftly up and down the roadway. What are they hawking for on such a day as this is

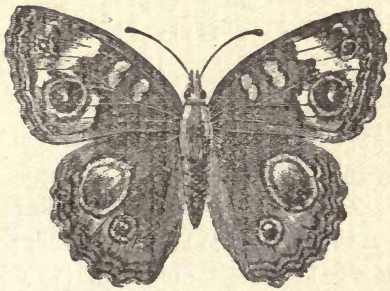


Fig. 6—The Buckeye Butterfly.
Junonia cœnia Hub.
(After French.)

to me a mystery, for I see no sign of mosquito or other dragonfly tid-bit in the cold raw air.

Of butterflies I note another old friend, the giant swallowtail, *Papilio cresphontes* Cram., but it, too, is propelled onward by the stiff breeze too rapidly for me. Two worn and be-draggled specimens of the buckeye butterfly, *Junonia cœnia* Hub., alone are captured. Both it and *cresphontes* range as far northward as northern Indiana, though both are scarce in that State.

Over a sandy stretch in the old orchard I find the locusts common; among them the *Arphia* taken yesterday, as well as a handsome, parti-colored species, *Scirtettica picta* Scudd. The male of this usually flies a long distance when flushed, making, while on the wing, a noise like the buzzing of a very angry bumble bee. The female is more sluggish, and noiseless in its flight. The common, green-striped grasshopper of the north, *Chortophaga viridifasciata* De Geer., is also present in numbers on the sand covered earth. Its hues are, however, so different that I do not recognize it, and think it an undescribed form until I reach the house and consult Scudder's table of variation of the northern and southern forms. On a patch of green weeds I find a pair of wingless, bright green locusts—the tegmina being represented only by narrow, oblong, whitish yellow scales. They leap clumsily when disturbed. They prove to be examples of *Aptenopedes sphenarioides* Scudder, a species

known only from Florida. On a dead clump of grass in a neighboring field I take a brown male of the same species, so that it, like many other acridians, seeks a place of hiding with which it agrees in color. There, as long as motionless, it is quite secure from the eyes of those birds and reptiles which are ever on the search for a juicy locust.

Thus, though the wind continues to blow strongly and the air is so cold that I shiver when standing still for any time, I find, by persevering search, forms of interest in this old orange orchard, and trudge homeward, well satisfied with my morning's outing.

March 8, 1899.—Another day dawns, clear, breezy and cold—four degrees below the freezing point. One feels the chill much more here than in the north, especially after enjoying a few days of warm weather. Wrapped in our overcoats, Mr. B. and I sallied forth, he armed with rifle to bring down any squirrel which may be foolish enough to venture out on such a day; I, with butterfly net, to swoop in the more foolish insects, if any such I meet. Our destination was some old Spanish chimneys in the hammock about two miles west of Ormond.

As the term "hammock"* will be frequently used hereafter, a definition of it will not be amiss at this point. In the Gulf and South Atlantic states it refers to any area whose soil is other than sand. If a

*Preferably "hummock," according to the Century Dictionary, though invariably "hammock" in Florida.

"high hammock," its general level is a few feet above the surrounding marshes. If a "low hammock," it is a marsh or swale. In either case it is usually underlain with marl or coquina rock, and covered with a rich vegetable mold. These hammocks form the richest portions of Florida. On them, or in them, grow all the hardwood timber. In contra-distinction to the hammocks are the "barrens" or "pine lands," whose soil is of sand alone or of sand mixed with a small percentage of marine salts and organic matter. Humus, or vegetable mold, is the needed constituent of the barrens. It is always present in quantity in the hammocks. Hence the latter, when cleared of their timber and cultivated, are profusely productive of almost every kind of vegetable. Such land, when cleared within two miles of Ormond, sells readily at $100 or more per acre, whereas the sand-covered land can be had for one-tenth that sum, and for the most part is dear at any price. The underlying marl and cemented mass of sea shells seem to yield constantly certain elements which find their way to the surface of the hammock and form an abundance of plant food. The soil can, therefore, be used for years, whereas two or three seasons are sufficient to deplete the sandy soils of what little organic matter they possess.

Soon after starting, Mr. B. shot a pileated woodpecker, or log cock, *Ceophlœus pileatus* L., from the top of a dead cabbage palmetto. It is a male, some-

Pl. IV.

One of the Old Spanish Chimneys.

what smaller than the northern form of the same species. This diminution in size is noticeable in the blue jays, crows, squirrels and many other birds and mammals hereabouts.

The road led between deserted orange groves, where many thousands of dollars have been lost by unlucky northern investors. The "cracker," or native of Florida, knows better than to invest time and money in orange groves in this portion of the State, where King Frost is apt to reign supreme one or more times each winter. The cracker is not averse, however, to selling his cleared hammock lands for fabulous prices to the tyro from the north who wishes to set out orange orchards.

The old Spanish chimneys are much visited by the aristocracy who stop at the great Hotel de Ormond. To them they go in rubber-tired carriages or on horseback, never afoot. At them they gaze, and marvel o'er these monuments of a dead and misty past. The chimneys are three in number, each about twenty feet in height. One is formed of coquina rock, the other two, of brick. The latter are still connected with the remains of furnaces in which, 200 years ago, the juices of the indigo plant and sugar cane were boiled. The hammock on which they stand was then cleared and doubtless produced bounteous crops. 'Tis now covered with a dense growth of cabbage palmettos, saplings and underbrush.

These remains of old Spanish settlements are found in various parts of Florida. They were noted by Bartram more than a century ago, he writing of them as follows:* "We passed four or five miles through old Spanish fields. There are to be seen plain marks or vestiges of the old plantations and dwellings; as fence posts and wooden pillars of their houses, chimneys, ditches, and even corn ridges and batata hills. From the Indian accounts, the Spaniards had here a rich, well-cultivated and populous settlement, and a strong fortified post, as they likewise had at the savanna and fields of Capola, but either of them far inferior to one they had some miles farther southwest toward the Apalachuchla River, now called the Apalachean Old Fields, where yet remain vast works and buildings, as fortifications, temples, some brass cannon, mortars, heavy church bells, etc."

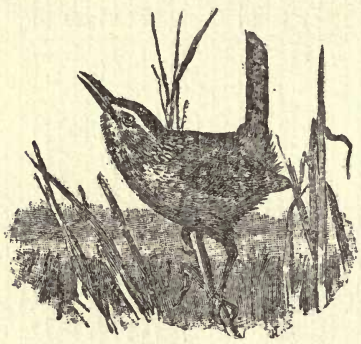


Fig. 7—Long-billed Marsh Wren.

These various Spanish settlements probably

*Travels through North and South Carolina, Georgia, East and West Florida, etc., 1793, p. 231.

reached their greatest prosperity in the early part of the eighteenth century. About the middle of that century they were deserted on account of imbroglios between Spain and other nations, as well as the hostility of the Indians. Bartram's work was, therefore, written a half century after their abandonment.

On the way back from the old chimneys I noted the long-billed marsh wren, *Cistothorus palustris* Wilson, and the Maryland yellow throat, *Geothlypis trichas* L.—both old northern acquaintances — flitting about the weedy margins of a marsh. Flocks of turtle doves were also seen, but they appear to be less common here than the ground dove, *Columbigallina passerina* L. The first part of this long scientific name signifies "pigeon" and "hen," and the latter part, "like a sparrow," the dove partaking of the characteristics of all three of these well-known birds. They are but little larger than the English sparrow, greyish olive glossed with blue above; the male with the head and breast wine colored. Settling down in the streets and the back yards, they search for food, bill and coo, almost regardless of the presence of man. Bartram mentions

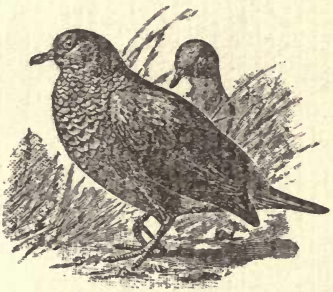


Fig. 8—Ground Doves.

them as follows: "Catesby's ground doves are also here in abundance; they are remarkably beautiful and their soft and plaintive cooing perfectly enchanting.

> How chaste the dove! 'Never known to violate the conjugal contract.'
> She flees the seats of envy and strife, and seeks the retired paths of peace.'"*

Among the hard woods growing in the edges of the "low hammocks," I noted the following northern forms: Bitter-nut, *Hicoria minima* Marsh; sweet-gum, *Liquidambar styraciflua* L., and the wild black cherry, *Prunus serotina* Ehrh. None of these, however, seem to reach the size they do in the north.

Near the edge of the town we saw a native woman busily engaged in doing the family washing. The clothes are dipped in a tub of water, then placed on a block of wood and pounded with a club.

In the afternoon I went again to the old orange orchard in search of insects. A little black and brown ground cricket, *Nemobius ambitiosus* Scudd., I found to be frequent among dead leaves and short grass along hedge rows and borders of the forest. It is smaller and more handsome than our common northern form, *N. fasciatus vittatus.* The face is jet black, with a narrow, whitish-yellow transverse line just below the base of the antennæ, while the femora bear

*Loc. cit., p. 8.

lengthwise bands of black. Otherwise the color is a reddish brown, though a few males are almost wholly black. I afterwards found it quite common and, at this season of the year, the only species of Nemobius about Ormond. The first specimen of a large butterfly, *Papilio palamedes* Drury, which was also afterwards taken in numbers, was secured.

Fig. 9—Ground Cricket.
Nemobius fasciatus vittatus Harris.
(Female, twice natural size.

March 9, 1899.—To-day the sun shines from a cloudless sky, as it does on most days here, but to me it matters little whether it shines or no, for the old pain at base of brain is present in full force. I cross the river and the peninsula for a stroll along the ocean's margin at low tide. Before me, blue, blue, a dull, slaty blue, the waters roll. No sail, no bird, no sign of life! Here and there, far out, a white cap flecks the surface for an instant—then vanishes. 'Tis like some human lives—rising by long endeavor for a brief moment above the common vulgar wave—then, sinking forever to the level. It is ever thus. The day of despair followeth the day of hope. The morn may break ever so fair; our ship, with all sails set, moving steadily forward on what

seems a most prosperous voyage. Before nightfall the waves of adversity beat about us and we are lost; wrecked on some unthought of—unheard of—shore.

The roar and surge of the incoming tide are alone borne to my ear—a dull, monotonous sound in the calm of midday. My companion stops to gather a few quarts of living "coquina clams," *Donax variabilis* Say. At low tide they are found in numbers but an inch or two below the surface of the sand. He puts them into a perforated iron basin and, by shaking them to and fro in the pools of water, cleanses them of sand. They are used extensively for making soup, being boiled, shells and all, the liquid then separated by straining. Here and there a sea snail, *Polinices duplicata* Say, has thrown up a mole-like burrow of sand a yard or two in length. By a kick of the foot it is easily dislodged from the end of its burrow. This mollusk is very common along this portion of the Atlantic coast. The empty shells of it and other species are often inhabited by the hermit crab, *Eupagurnus bernhardus* Desm., and its allies. As the crabs increase in size they exchange the smaller shells for larger ones.

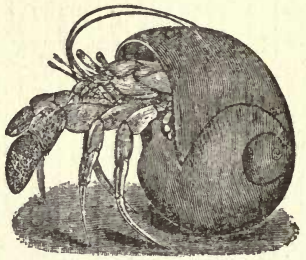


Fig. 10—Hermit Crab in shell of Sea Snail.

The ocean, kingly at times in its majestic power, is to-day wonderfully calm and meek. The surf runs low, the waves breaking on the outer bar, some fifty yards from the water's edge, then flowing peacefully inward. Inch by inch, each one comes nearer and nearer, until in time they will reach and pass beyond the spot where I now sit. At present one hundred yards of sand, at first whitish; nearer the water, brownish-red, intervenes between me and their edge.

The rich man, his wife and children, stop at the great hotel; pay $5 each per day for board, and when they wish an outing order a carriage, wrap themselves in woolens and furs, and ride haughtily along the beach, seeing little beauty in the ocean, less in the land. The poor man, clad in homely frock, walks, independent and free, needing no wraps, his exercise furnishing bodily heat in excess. He breathes great volumes of the invigorating sea air and rejoices that he can pass a few days along these shores. Which of the two is the happier?

March 10, 1899.—The morning cloudy, and by ten o'clock very sultry. I start west from Ormond, going back among the hammocks. In the outskirts of the village, near an old deserted blacksmith shop, I find beneath boards a number of specimens of a large, flat, bluish-green centipede, *Scolopendra morsitans* L., which is very common in this vicinity. Its bite is reputed to be poisonous, but I can find no one who knows by experience whether this is true or not. In

a decaying palmetto log I secure two mature specimens of a small cockroach, *Ceratinoptera lutea* Sauss.-Zehnt. This I have seen twice before, but have not been able to capture until to-day. It seems to occur rarely about palmetto logs and beneath rubbish. In color it is brownish yellow, flecked with dusky on the pronotum. The wings just reach the end of the abdomen and the total length of the body is less than one-third of an inch.

But few of the large roaches, *Eurycotis ingens* Scudder, have as yet reached maturity. The young, however, are very common beneath rubbish and the bark of stumps. It is my opinion that *E. sabalina* Scudder is but the immature form of *E. ingens*. It was described at the same time,* the chief differences noted being the total absence of tegmina and wings and the presence of a rather broad band of yellow on the margin of pronotum, mesanotum and part of metanotum. All the young of *E. ingens* possess these characteristics, the yellow band disappearing in the final moult.

Beneath a board I also find two specimens of the small greyish-brown ground lizard, *Oligosoma laterale* Say, one minus its tail, the other with what appears to be a reproduced tail, a bright red in color. This species occurs as far north as southern Indiana, but is there rare.

* Proc. Bost. Soc. Nat. Hist., XIX, 1877, pp. 92, 93.

A female of that small and handsome, blue-winged yellow warbler, *Helminthophila pinus* L., is seen in the underbrush along a sandy roadway. It feeds fearlessly on a low shrub within ten feet of me, and once flits to the ground for some morsel which it espies from above.

Crossing the railway, I enter the low hammock region—a large, marshy tract covered with a dense growth of cabbage palmetto and swamp-loving underbrush, and containing numerous pools of blackish water scattered through it. Indeed, so little is the region about Ormond and, for that matter, all northeastern Florida, raised above the level of the sea, that were the land depressed ten or twelve feet below low water mark, the ocean would once more assert its sway over the larger portion, leaving exposed only narrow ridges along the coast and low islands inland. At present, extensive areas are under water throughout the year, and the surface is made up of an immense number of ponds, creeks, lagoons and swamps, intermingled with pine-barrens, hammocks covered with hardwood growth, chaparrals of saw palmetto, and wet marshes overgrown with tall reeds or rank grass.

In places, tracts of the low hammocks west of Ormond have been cleared, partially drained, and cultivated—formerly in oranges, now in vegetables. A darkey is plowing in one of the small fields, using a single horse. Following in his furrow I find a num-

ber, most of which are dead, of that curious snail, *Polygyra auriculata* Say. It is known only from Florida, and is readily distinguished by the great development of the parts about the aperture, which are so formed as to somewhat resemble an ear, whence the specific name. Beneath the rubbish near the margin of this cleared tract I also take numerous specimens of *Physa pomilia* Conrad, and a very large example of millipede, *Spirobolus spinigerus* Wood, which the darkey said was sometimes so common that he could gather a hat full.

Fig. 11.
Polygyra auriculata Say.
(Enlarged.)

Asking him about lizards, he said there is one about eight inches long, with red head and large ears, which lives beneath logs—"but, O Lawd, boss, I'se afeared to touch him." He probably referred to old specimens of *Eumeces fasciatus* L., a very common lizard hereabouts. Speaking of the centipede, *Scolopendra morsitans*, he said: "It's all day wiz you-all if one of them air centipedes strikes you." When asked if their bite killed a person, he said, "No, but it makes 'im sick fer a month."

March 11, 1899.—To-day, one week ago, I arrived in the "Land of Flowers." At this season of the year it belies its name. Few are the flowers which I have seen. 'Tis a land of sunshine, but too often the icy breath of King Boreas sweeps down and pinches with

unusual vigor the fingers and toes of the unprepared residents.

This morning the sun rises bright from old ocean's bed. The birds in full chorus greet its appearance. Crows call with that peculiar low "kah" characteristic of them here. Blue jays utter their shrill, querulous cry on every side. In the bay tree in the back yard a golden-crowned kinglet, *Regulus satrapa* Lich.,

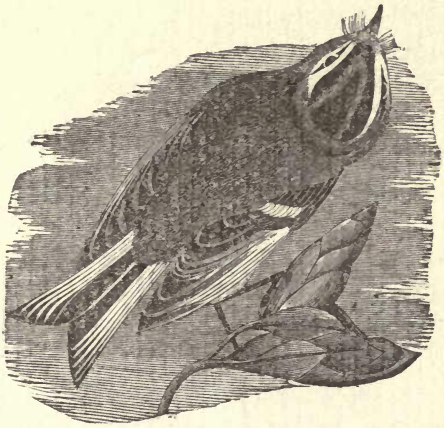


Fig. 12—Golden-crowned Kinglet.

scolds in a peculiar wheezing tone—a scold resembling the subdued note of a hen's cackle. It hops as it scolds, here and there, industriously picking meanwhile at whatever appears good to eat on the ends of the branches.

In the old orange orchard I to-day secure several

examples of a large locust, *Schistocerca damnificum* Sauss. It is closely allied to *S. alutacea* Harris, but the antennæ of the male are shorter and the yellow line along the middle of pronotum and tegmina is much less prominent, while the notch at the apex of sub-genital plate of the same sex is narrowly V-shaped, rather than broadly U-shaped as in *alutacea*. Many specimens of *damnificum* are flushed from clumps of a coarse brown bunch grass the exact color of its body. They fly long distances to limbs of pine or other trees, around which they dodge, and from which they are taken with the hand. The Tryxalid, *Amblytropidia occidentalis* Sauss., once before mentioned, has become common in this old orchard. It, too, occurs only in the clumps of brown grass, which give it protection on account of its hue. This grass is, for the most part, overgrown with tangled masses of smilax, so that operations are necessarily slow and arduous. When aroused these locusts fly always to a clump of the same grass and dive into it, burrowing down among the roots until they are most difficult to find, so that I lose more than I take.

That large and handsome sulphur-colored butterfly, *Callidryas eubule* L., is just emerging. I note a number of them to-day, but they fly wild and I secure but one male. It ranges from central Indiana, where, in August, I have taken it in numbers on the sand hills along the Wabash River, southward and westward to southern California—a vast territory for so

frail an insect to have covered. But the various species of Cassia, or wild senna, on the foliage of which the larvæ feed, occur over the same range, and so have rendered possible the spread of the insect.

In the vicinity of Ormond artesian sulphur water is obtained at a depth of 150 feet; rising four to six feet above the surface when the vein is tapped. But few springs or shallow wells are found, cistern water being mostly used where the artesian bores have not been sunk.

March 12, 1899.—Three days ago I wore an overcoat, heavy winter underwear, and sought the sun. To-day I am dressed in thinnest garb at my command and seek the shade. Such is the change wrought in the temperature of the air about me by the unequal heating of certain portions of the atmosphere surrounding this earth of ours and a consequent shifting of those portions. Three days ago great volumes of cool air came rushing down from the north. To-day they are replaced by other volumes rushing up from the south. Too few people realize that a change in temperature is but a change in that portion of the atmospheric ocean which surrounds them; great waves of cold air from another part of that ocean descending and pushing out the warm, or rising into other regions to fill a vacuum, and allowing waves of warm air to take their place.

As with the winds, or waves of air, so with the drifting tides of a man's life. A year ago I was happy and contented with those I love in the far north. To-day 'tis Florida's sky, bright and beautiful, above me. Next year, it may be Greenland's; cold, cheerless and forbidding. What matters it—the world wags on. The memory of happier days will cling—can not be shaken off. Then—

> "Here's a sigh to those who love me,
> And a smile to those who hate;
> And whatever sky's above me,
> Here's a heart for every fate."

To-day the sand burs stick closer than a brother; likewise the wood ticks. I distribute both from one field to another.

The first tiger-beetle which I have seen flits from point to point before me on the sandy woodland path. I finally succeed in casting my net over it before it can arise, and find it to be a male of *Cicindela unicolor* Dej., two-fifths of an inch in length and a uniform dark blue in color, with the exception of the labrum and base of mandibles, which are ivory white. The female, taken at a later date, is dark green in hue, with the mandibles wholly black. Beetles of all kinds seem scarce here at this season. It appears that, notwithstanding the quite uniform temperature which prevails, for the most part, throughout the year, the dry season, which corresponds to the win-

ter months, causes a disappearance of most forms of insect life. With the coming of March they begin gradually to reappear, but there is no spring flight of beetles, and those which pass the dry season in the perfect or imago stage seem to be much fewer in number than in the north, where I have taken three hundred and more species thus hibernating.* It is said that not until the beginning of the wet season, in the latter part of May, do the majority of the summer fauna of Coleoptera and other orders of insects begin to make their appearance in Florida.

Large numbers of the American locust, *Schistocerca americana* Drury, have now reached maturity. When flushed they are most difficult to capture, mov-

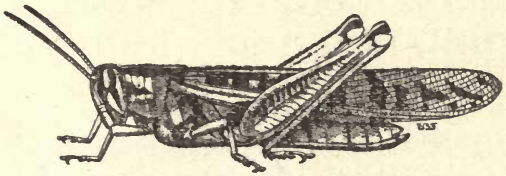


Fig. 13—American Grasshopper.
Schistocerca americana Dru.
(Male.)

ing in rapid, rollicking flight to tree or tall shrub and alighting usually far above the reach of my net. It was probably from such a source as this that the large numbers of mature specimens blown into In-

* See Psyche, 1896, p. 336, *et seq.*, for an annotated list of 286 of these.

diana on April 11, 1893, started on their long ærial journey.*

Chamæleons run swiftly over the earth, making a rustling noise as they scurry through the dead leaves and grass.

The long, gray, epiphytic moss, *Tillandsia usneoides* L., is very common in all the lower portions of east Florida.† It is one of a half dozen or more species of the same genus which abound in the State, but the only one with filiform, pendent stems and green flowers. Its scurfy and hoary clusters, swinging to and fro with every passing breeze, give a tinge of desolation to the surroundings of the low hammocks and cause a deeper sense of solitude and loneliness in the mind of the wandering naturalist who invades their midst. As far back as 1793, Bartram wrote of it, as follows: "The long moss, so called, is a singular and surprising vegetable production; it grows from the limbs and twigs of all trees in these southern regions. Wherever it fixes itself, on a limb or branch, it spreads into short and intricate divarications; these in time collect dust, wafted by the wind, which, probably by the moisture it absorbs, softens the bark and sappy part of the tree, about the roots of the plant, and renders it more fit for it to establish itself; and from this small beginning, it increases, by sending

*See Psyche, June 1893, p. 465; also the author's "Gleanings from Nature," p. 238.

†Festoons of this moss are shown in the frontispiece, hanging from the branches above the cabin.

downward and obliquely, on all sides, long pendent branches, which divide and subdivide themselves ad infinitum. It is common to find the spaces betwixt the limbs of large trees almost occupied by this plant; it also hangs waving in the wind, like streamers, from the lower limbs, to the length of fifteen or twenty feet, and of bulk and weight, more than several men together could carry; and in some places, cart loads of it are lying on the ground, torn off by the violence of the wind. Any part of the living plant, torn off and caught in the limb of a tree, will presently take root, grow and increase, in the same degree of perfection, as if it had sprung up from the seed. When fresh, cattle and deer will eat it in the winter season. It seems particularly adapted to the purpose of stuffing mattresses, chairs, saddles, collars, etc.; and for these purposes nothing yet known equals it."

That the use of this moss in upholstery has become a prominent industry is shown by the following extract from a recent Government publication: "The long moss, when gathered by men known as 'swampers,' is piled up and allowed to rot for ten or twelve months. It loses in this process about ninety per cent. of its weight, and is then shipped to the factories, where it is cleaned, dried and ginned, the final product being a hard, black elastic filament, greatly resembling horse hair. This is used in upholstering, either alone or mixed with hair. Six moss factories

are located in New Orleans, and two others at Pensacola, Florida. The six factories at New Orleans received, during the last year, 3,500 bales of rough moss, weighing 10,000,000 pounds, and valued at $315,000. A considerable amount, however, is ginned in the country and shipped direct to consumers, or is prepared by the consumers themselves. Persons most familiar with the volume of this industry estimate that the value of the prepared moss gathered annually in Louisiana, the principal region of supply, is not far from $550,000. The amount gathered, however, varies considerably from year to year. Moss can only be profitably collected at times of high floods, when the swamps are navigable to small boats, and the moss, hanging from the branches of the trees, can be easily gathered. The wages earned by the swampers, too, are not large, and the gathering of moss is only resorted to when more profitable employment upon farms can not be obtained."

March 13, 1899.—'Tis hot, hotter than ordinary March days here, say the old residents. During my walk to the hammocks beyond the railway I have chewed the bitter cud of memory, a memory of a past when life was all before me and false friends were not mine. Then I had no favors to bestow. As soon as one possesses such favors he begins to make enemies. Without them he awakens not jealous contentions and fierce fights for plunder. He can walk forth, a free man, happy in his poverty, contented

in his thought. Experience has taught me, as it will every man in time, that health and contentment are the two most precious gifts vouchsafed to mortal man during his brief sojourn here on earth. They alone make up what the average person calls "happiness here below."

Tearing off the bark from the base of a rotten pine stump I make my first capture of the morning—a female of the large southern Elaterid, or click beetle, *Alaus myops* Fabr. It is one and one-half inches in length, and is the second largest representative of its family occurring in the United States, being exceeded only by *A. oculatus* L., which ranges farther north. A female of the latter species from Indiana measures one and three-quarters inches. The males of both species are smaller, averaging but little over an inch in length. *A. myops* is dark brown, clouded with ash gray, and the eye-like velvet spots on the pro-thorax are dim and narrowly oval; whereas *oculatus* is black, sprinkled here and there with silver gray, and has the eye spots round and prominent. The larval stage of both is passed in decaying oak, apple and pine wood.

Fig. 14.
Alaus oculatus L.

The members of the family *Elateridæ*, of which *A. myops* and *A. oculatus* are the giant representa-

tives in this country, are commonly known as skip-jacks, spring beetles, snapping beetles or snapping bugs. They are very numerous, both in species and in individuals, and the young of a number of them are injurious, being the wire worms which prey upon the roots of grass, corn, and other cereals. When placed upon their backs all of these beetles have the power of leaping into the air and turning over; whence the common names above mentioned. This power has brought them to the attention of many persons who otherwise would have passed them by unnoticed, and much wonder has doubtless been caused as to how the leaping motion was brought about. When the beetle, by accident or otherwise, finds itself on its back, it folds its legs and antennæ closely against the body and for a time simulates death. When it thinks the danger is over it bends back the head and pro-thorax as far as possible. This action lifts a spine attached to the hind margin of the pro-sternum (under side of pro-thorax) out of a groove in which it ordinarily rests. This groove is in the front margin of the meso-sternum, and directly beneath the bases of the elytra or outer wings. After withdrawing this spine to its full extent, the muscles are suddenly relaxed, allowing the spine to descend violently into the cavity. The force given by this sudden movement causes the bases of the elytra to strike the earth or other substance upon which they rest, and, by their elasticity, the whole body is propelled upward

sometimes to a height of several inches. If, during the act of rising and falling, the acrobat turns over and alights on its feet, all is well. If not, the process is repeated until it finally alights right side up with care.

The spring flowers of this locality are beginning to blossom. A dainty little Legume, with petals pink and white, grows in abundance in the damp sand along the railway. A large coarse-leaved thistle, *Carduus horridulus* Pursh., is in bud and flower, with one head mature. On its flowers are two specimens of *Papilio palamedes* Drury, and a greenish bee. Beneath its bracts and in the angles of its upper leaves are two species of Heteroptera, or true bugs, and two of beetles, the most common of which is a small, light brown snout beetle, *Notolomus basalis* Lec. Both bugs and beetles appear in a dazed, or comatose, condition. They have probably been sipping the juices excreted from the glands on the outside of the involucral scales. In the north, many beetles and other insects become dazed or intoxicated by feeding upon the excretion of similar glands on the involucral scales of *Carduus discolor* Gray.*

One of the bugs taken on the thistle is *Thyanta custator* Fabr., a brownish green form, one-third of an inch in length, which occurs throughout the United States, but is more common in the south. It belongs to the "stink-bug" tribe, whose members protect

*See Can. Ent., XXIV, 1892, p. 310.

themselves by exuding a drop or two of liquid having a very disagreeable odor, from two openings, one on each side of the lower part of the body near the base of the middle legs. Birds, and people, too, for that matter, soon learn to avoid the bugs which excrete this odor. Many a boy, while berry hunting in the country, has clapped a number of berries into his mouth, only to experience a smarting sensation and a nauseating taste, brought about by the acidulous liquid from the glands of a stink-bug which accompanied the berries. In this way, if in no other, the boy learned the virtues of the protective principle possessed by the stink-bug tribe, and future stink-bugs, if not the one in the mouth, profited as a result. Birds probably learn to avoid the use of stink-bugs for food in much the same manner; though, like many other traits of the lower animals, this knowledge may in them be instinctive rather than acquired.

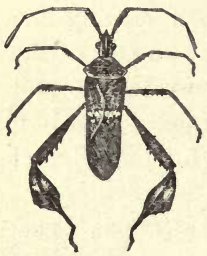


Fig. 15.
Leptoglossus phyllopus L.
(Three-fourths natural size.)

The second species of bug on the thistle is *Leptoglossus phyllopus* L., dark reddish brown in color and three-fourths of an inch in length. A distinct, narrow whitish band crosses the outer wings; while the hind tibiæ bear broad, flattened, leaf-like projections, each with a small white spot near its inner edge. This is a true

southern insect, and is thought to be beneficial, inasmuch as it has been found feeding on its distant cousin, the injurious harlequin cabbage bug *Murgantia histrionica* Hahn.; however, it is known to injure cotton bolls and oranges.

In the afternoon I visit Captain Wardwell, the owner of a small steamer which plies up and down the Halifax River. He is a good observer of nature, and showed me many interesting specimens. Among them were part of a tusk, a tooth and several vertebræ of a mastodon, *Mastodon americanus* Linn., taken in the marl beds underlying a nearby hammock; also the "ear bones" of a whale, picked up on the beach.

March 14, 1899.—This morn I arose at 5:30 o'clock, breakfasted at six and rode in an ice wagon to Daytona, a village five miles below Ormond. Here I took a gasoline launch with a party bound for Mosquito Inlet, at the mouth of the Halifax River. The ride was a pleasant one. The lower part of the river is dotted with many islands. On these grows in profusion that curious tropical production, the mangrove, *Rhizophora mangle* L., a small tree or shrub, with obovate-oblong leathery leaves and seeds which germinate within the fruit while the latter is still hanging on the branch. The radicle extends downward until it reaches the ground where it roots, thus forming new trees and almost impenetrable thickets.

Mosquito Inlet is the northernmost point at which the mangrove flourishes.

Oyster beds are very common in this portion of the river; their product being gathered and sold at points higher up. At last we arrived—

> "At the inlet bar where the yellow sands
> Gleam bare when the tide is low,
> And the crested line of the tumbling brine
> Flings the froth like driven snow."

The Atlantic is here much wilder than at Ormond, the breakers extending farther out, and the beach, or distance between high and low tides, twice as wide. Sea shells were much more abundant, but were, for the most part, species of *Arca* and other common forms.

The most prominent objects along the beach were several pairs of king, or horse-shoe, crabs, *Limulus polyphemus* L. Most interesting to naturalists are they on account of being the sole living representatives of a great group of crustaceans which, beginning in the Lower Silurian, culminated in the Upper Silurian, and practically died out at the close of the Coal period. The Eurypterids of the water-lime formation were the giants of this group, while the trilobites of the different ages were its most common representatives.

The female of the largest pair of king crabs on the beach measured twenty-three inches in length by ten

inches in breadth. The male was little more than half as large. They have two pairs of compound eyes, a horse-shoe shaped cephalo-thorax, composed of six segments, and an abdomen of nine segments, the last of which forms a long spine, or bayonet-like tail. Six pairs of appendages are attached to the cephalo-thorax, the hand and opposing thumb of the first pair being modified in the male, to serve as clasping organs. It is said that along the Florida coast the eggs are laid in May, being deposited by the mother in the sand between the limits of high and low tide. They hatch in six weeks, the young being but one-quarter of an inch in length. At the end of a year they are but one inch long, so that a specimen the size of the one I measured must have been a hoary patriarch.

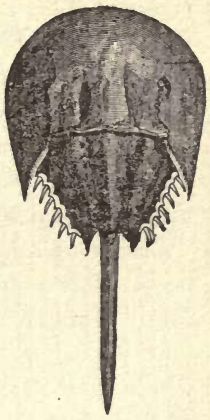


Fig. 16—Horse-shoe Crab.
(Greatly reduced.)

The king crabs burrow in the sand, and are said to live mainly on sea worms, though the decaying bodies of fishes and other aquatic animals probably furnish them much food. They swim but clumsily, crawling, for the most part, slowly along the bottom. They are sometimes called "sauce-pans," on account of the shape of the shield of the cephalo-thorax, which is

often used to bail out boats. Hogs and poultry relish them much as food and many are speared for that purpose.

One which I turned over on its back succeeded in righting itself after about a quarter of an hour's effort. It did this by bending back the front portion of the shield as far as possible; then turning one edge against the sand and using the tail as a lever, it finally, after many efforts, went over with a flop. This is contrary to the statement of that eminent naturalist, Thomas Say, who wrote of them as follows: "When cast ashore by the waves, if they fall on the back, they can not recover their proper position. Many people feed their hogs upon them, and it is said that some hogs that roam at large in the districts where they abound, become acquainted with the fact of their inability to turn themselves when placed on the back, and when there happens to be a scarcity, with a provident sagacity, they turn as many as they can eat, or as are within their view, before they proceed to satisfy their hunger. This fact with respect to one hog was related to me on good authority."*

Several examples of the brown pelican, *Pelecanus fuscus* Linn., were noted flying along the shore and wading in the shallow pools. They appear to be a dusky gray rather than a brown in color, and are smaller than the white pelican, *P. erythrorhynchos* Gmel., which ranges north as far as the Great Lakes.

*Journ. Phil. Acad. Nat. Sciences, I, 1818, p. 435.

A fish hawk was seen to catch a large fish, and, after rising 50 feet in air, utter two squealing notes and drop it back into the sea. I looked around, expecting to see a bald eagle, and hear the rush of its wings, but nothing was in sight. Possibly the fish saved its life by being too great a burden for the bird to carry.

Those curious little crustaceans, the fiddler crabs, *Uca pugilator* Bosc., are very abundant near the inlet, as they are also along the river banks at Ormond. They are easily recognized by the extraordinary development of one of the claws or chelæ of the males. This large claw is used in fighting, which accounts for

Fig. 17—Fiddler Crab.

its size and strength. In the same way a man's right arm is larger than the left on account of its more active use. The females have little cause for fighting, and both claws are, therefore, small. The large arm

of the male fiddler may be either on the right or left side. In its movements on land, which are sidewise, very rapid and ludicrous, it carries the enlarged hand above the ground, but on the slightest alarm, stops and raises it, extending the fingers in a threatening manner. This arm is also used to beckon or challenge other males of their kind to a fight, hence they are sometimes called "calling crabs." They burrow just above high water mark along the banks of the river and brackish marshes, honeycombing the ground with innumerable openings of such a size that when they retreat therein the great claw serves as a clog or stopper for the entrance. These fiddler crabs are much used as bait for fish, and myriads of them doubtless fall a prey to crows, herons, gulls and other shore visiting birds.

That fish-like mammal, the harbor porpoise, or puffing pig, *Phocæna communis* Lesson, is common along the East Florida coast, and ascends the Halifax River as far as Daytona. A number were seen to-day, both in the surf of the ocean and in the river, the former in herds or shoals, wallowing and sporting, and ever and anon turning and exposing their paler under surfaces. They reach a length of five and a half feet, and are said to feed almost wholly upon fish. From their blubber a fine oil is made, and their skins are utilized for leather, but the flesh is impregnated with the oily taste and strong odor characteristic of all fish-eating animals.

March 15, 1899.—I sit at the base of a yellow, or short-leaved, pine, *Pinus mitis* Michx., my head against its fragrant trunk which rises, far out-topping the grove of cabbage palmettos in the midst of which it stands. My muscles are tired and my brain aweary, the results of yesterday's trip, which was too much for me in my present weakened condition.

As I came out of the woods this morning and struck the railway, I thought of it as that bond which makes the whole world kin. From ocean to ocean it stretches away; from lake to gulf its rails and sleepers lie. Over its bed come daily tidings from the far north, where yet the ice king holds his thrall and rules over all with bonds of frozen moisture. Here, balmy the breeze that kisses my brow, blowing as it does from the Gulf Stream, 120 miles to the southeast. In a letter received this morn a friend has used the word "luxuriate." That is what I am trying to do. Soothing the sunshine! Let it fall around me and fill my body and soul with *new* energy. Let it rejuvenate me.

The sight of a tadpole in a pool of dark water beside the railway had a thrilling effect upon me as I trudged hither. It awakened the cells of memory and caused me to think thoughts and dream dreams of other spring days in the calendar of my life; of other days when the frogs sang for the first time, when the first chewinks and fox sparrows darted before me from my pathway—when every bud felt the

influence of such a breeze as that now fanning my cheek—when sap ran riot in the veins of plants and insects' wings began their humming.

The colored section hands have cut down the thistle which, two days ago, blossomed for me. Methinks no one but I saw the beauty of its bloom—I and the insects which it attracted unto itself.

Along the margin of the marsh before me grows, in these pine and palmetto woods, a shrubby buckeye, *Æsculus pavia* L., now putting forth its handsome oblong panicles of rose red flowers. Insects by scores are visitors thereto, but, for the most part, they are the common species of butterflies.

A bare-footed, freckle-faced white boy, a dozen years of age or thereabouts, from whom I purchased some chamæleons a few days ago, meets me on the way hither and greets me as an old friend. I had asked him to capture some snakes for me, and he tells me that he has one coral snake, but adds that "snake hunting is hard work." He expects a quarter of a dollar for the one he has, and I tell him to bring it down to the village in a few days.

I pull the bark from about the trunk of a dead pine, five feet in diameter, for as high as I can reach. A careful inspection of both bark and trunk yields but three species of beetles, and one of these, a *Staphylinid,* I fail to capture. One of the others is *Morio monilicornis* Lat., a slender, dark, shining brown carabid, two-thirds of an inch in length; the

other, a male of the purblind click beetle, *Alaus myops* Fabr. A dead hardwood tree of similar size in Indiana would have yielded a half-dozen or more species, even in March.

A bevy of quails is flushed. With unerring sight they wing their way among the thickly growing palmettos and pines, striking none, but dodging now to the right, now to the left, in swift, unbroken flight.

Several specimens of a form of the zebra butterfly, *Papilio ajax* L., are seen, but they fly wild and escape the net. The papaw, *Asimina triloba* Dunal,

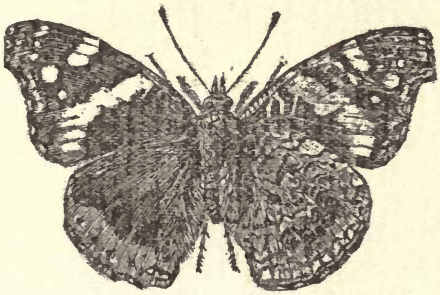


Fig. 18—Red Admiral.
(The under side of wing is shown on the right.)

upon which the larvæ of this butterfly feed in the north, is said not to grow in this vicinity. It is probable, however, that the closely allied southern forms, *A. grandiflora* and *A. pygmæa* Dunal, occur near here, though, as yet, I have seen no sign of them. The presence of the butterfly denotes that they are here. A pair of red admirals, *Pyrameis atalanta* L.,

are before me, flitting up and down and over and over in ærial courtship.

A large pileated woodpecker moves in swift, galloping flight from the side of a dead hickory, where he has been prodding for large red ants, to the top of a lofty pine. There he pauses, glances askance at me, the intruder on his domain, then utters his shrill, resounding call, which echoes far and wide throughout the forest. An answering call is soon returned from the northward, upon hearing which he wings his way in the direction from whence it came.

March 16, 1899.—It pays to take little trips to one side of the beaten pathway. This morning I went into the brambles and worked for fifteen minutes about some old decaying pine logs. The result was a "mule killer," or vinegerone, two true scorpions and a centipede—all "sure death" to the natives of this region.

The vinegerone, or whip scorpion, *Thelyphonus giganteus* Lucas, possesses eight legs and belongs to the group *Pedipalpi,* of the order *Arachnida.* It is, therefore, allied to the spiders, mites and scorpions, more especially to the latter. It is a hideous, dark brown, crab-like creature, two and a half inches in length, with a long and very slender, many-jointed telson, like the lash of a whip, attached to the end of the abdomen. The palpi are much enlarged, bear several coarse teeth, and end in more or less perfectly formed pincers. The front pair of legs are much longer and

more slender than the others. Though greatly feared by most persons, it is not poisonous. The forceps with which I captured the specimen at hand are strongly impregnated with the odor of acetic acid, one of the constituents of vinegar. This comes from a fluid which the animal, when alarmed, excretes as a means of defense, hence the common names, vinaigrier and vinegerone. In habits the whip scorpion is nocturnal, hiding by day beneath rubbish and feeding at night upon insects and other of the lower forms of animal life. It occurs only in tropical and semi-tropical regions — another specimen in my collection having been taken in southwestern Texas.

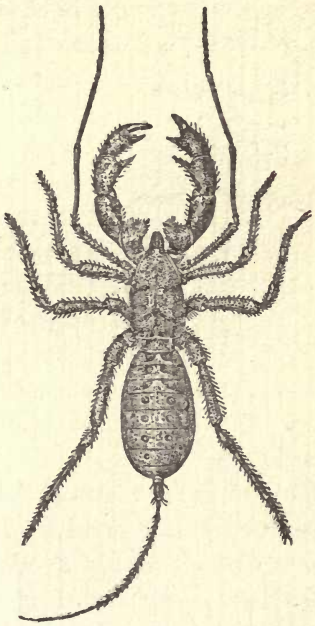


Fig. 19—Whip Scorpion.
(About three-fourths natural size.)

The true scorpions which I found about Ormond are all of small size and of one species, *Centrurus hentzi* Banks. They belong to the *Scorpionida,* a group coördinate with the *Pedipalpi* above noticed,

and characterized by possessing a long, slender post-abdomen, which can be curled up over the back and which is armed at the end with a sharp sting or telson, hooked like a claw. This is connected with a venom gland, so that its puncture inflicts a wound which is very painful. In *C. hentzi* the sting has a small tubercle or supplementary spine beneath it; the body is striped with black and yellow; the caudal portion being brown, and the legs yellow barred with brown. The largest one of a number taken measured but one and a half inches in total length. For the most part, they were found beneath bark or between piles of logs. They also are nocturnal and carnivorous in habit; seizing their prey, which consists mainly of spiders and insects, with the chelæ, and then stinging it. The young are said to be born alive and are carried about by the mother for some time, attaching themselves to her body by means of their slender pincers.

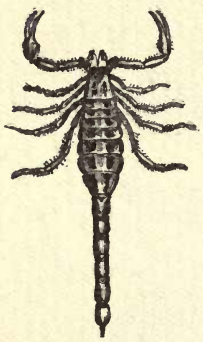


Fig. 20—A True Scorpion.

In a small clearing in the underbrush I also took to-day two females of a handsome, green, cone-headed grasshopper, *Conocephalus nietoi* Sauss. The fastigium, or projecting cone of the head, is short, stout,

rounded at the tip and margined in front with black. The ovipositor is the same length as the body, one and one-quarter inches, while the tegmina, or outer wings, are two inches. They were on clumps of green grass, into which they tried to escape by burrowing. A third specimen and a brown form of the same species were taken on later dates.

In the afternoon I visited the shell mound and dug for a while in its debris, taking out several pieces of broken pottery and a bone awl. I have interested a darkey, who is hauling the shells to town for sidewalks, and he to-day presented me with a small perforated bone ornament, which he had found while loading his cart. He is a typical "cracker negro," jolly and talkative on all occasions. He said to-day that that which surprised him was the way in which a northern man worked. "A southern gemmen, after getting fifteen or twenty thousand dollahs, will set down and do nuffin' but enjoy hisself fo' de rest o' his days, but the northe'n gemmen, he jes' keeps a wukin' on, same as evah, even if he is wuf a hundred thousand dollahs."

March 17, 1899.—Once more I rest my head against the bole of the pine tree in the palmetto woods. Once more the breeze from the Gulf Stream fans my brow, but it is cooler than when I was here before. For fifteen years I have been a naturalist. They have been years full of work, of hopes, of ambitions. Happiest those days when I have been alone

in woods and fields, when I was learning for the first time lessons from nature—lessons purer, nobler and better than I ever expect to learn from the books of man—lessons showing me the close relationship existing among all animate and inanimate things—teaching me that this world, this universe of ours, is not made up of single, isolated objects and forces, but that each object, each force is but a necessary part of one grand and perfect whole. At the end of fifteen years I am still a tyro—still learning daily new facts from the book of nature, still, and ever expect to be, a tramp naturalist. I still delight to chase the winged butterfly o'er field and pasture; draw the seine through ripple and shallow for silvery minnow and rainbow darter—climb hill and wade pond for partridge berry or water lily, or wander all day through thicket and forest in search of hermit thrush and hooded warbler.

I am not a specialist in any branch of natural history, nor do I ever expect to be one. I do not desire to spend my life in pondering over the synonymy, and studying the minute structure of the organs of some particular group of animal or plant life. The world at large will never know me as an eminent ichthyologist or botanist, ornithologist or entomologist, geologist or conchologist, but I wish to know myself as being, in a small way, an ichtho-bota-ornigeo-concho-entom-etc.-gist, and so be able to see more and more clearly as time goes on the mutual relations

and interdependence of the various classes of nature's objects. Such a course will never bring me the renown that I might have achieved had I become a specialist; but what is renown as compared with present happiness and pleasure? And then, as Emerson, in his Essay on Nature, says: "In the woods a man casts off his years as the snake his slough, and at what period soever of life is always a child. In the woods is perpetual youth." I do not desire to grow old too soon, and so will seek in the way that I have chosen that fountain of youth which Ponce de Leon sought for in vain on the coast where I am now sitting.

But little has, as yet, this morning been added to my store. A small, dark brown butterfly, *Nisoniades nævius* Lint., expanding an inch and a half and with a rather large, irregular umber spot on the fore wings in front of four very small sub-apical whitish spots, was taken. It has heretofore been known only from the region of the Indian River, one hundred and forty miles to the south. A small blue *Thecla* and a *Pamphila* were also seen, but escaped the net.

I pull the bark from the bole of a fallen yellow pine. A "red-headed" lizard, *Eumeces fasciatus* L., about ten inches in length, scurries away and runs into a crevice of the upturned root partially buried in the sand. I go after him with a trowel. While I am at work a mature roach, *Ischnoptera unicolor* Scudd., starts to fly away. I knock it down with the trowel,

and another March Orthopteran is added to my Florida list. The lizard is finally unearthed. The last jab of the trowel unluckily "details" him, but the tail and body, both squirming, are consigned to the bottle of alcohol. A few minutes later a young example of the same lizard, six inches in length, and possessing a bright blue tail, is taken. This lizard is the only one of our North American species which has the distinction of being "red-headed" when old, and "blue-tailed" when young. The variations between these two forms are many and have been the cause of much confusion in the descriptions of the animal. Even Holbrook, the father of American Herpetology, described and figured the two forms as different, calling the old red-headed one *Scincus quinquelineatus*, and the younger blue-tailed one, *S. fasciatus*.

Fig. 21.
Ischnoptera unicolor Scudd.
(Male.)

In a marl outcrop in a cut of the railway at the edge of a hammock a mile northwest of Ormond, the so-called "marl" is found to be a mass of finely comminuted shells, mingled with larger pieces of oyster, clam, conch, and other recent shells, now common along the beach. The thickness of this shell deposit could not be determined. Over it is a foot (eight to fourteen inches) of a reddish, sandy loam. This is

overlain by three inches of whitish sand, above which one to three inches of vegetable humus forms the surface. But a few thousand years have elapsed since this broken mass of shells was a part of the ocean's bed. Over it the reddish sand, already noted as at present occupying much of the space between the limits of high and low tide, was deposited by the water. The white sand was then blown over this by the wind, just as it is now being spread by that agency over the red along the sea beach. The saw palmetto and allied vegetation which first secured a foothold in the sand, died down and formed the beginning of the vegetable mold, which has gradually increased in thickness by the decay of many hundreds of generations of more luxuriant plants. In this way this hammock, and all others of a similar nature in East Florida, owe their origin to the agencies of the ocean, the wind and decaying vegetation.

March 18, 1899.—Beneath the bark of a fallen and decaying pine I found to-day two examples of that curious little toothless frog, *Engystoma carolinense* Holbrook. When the loose bark was pulled away they remained squatted close to the brown wood, which they resembled so closely that had it not been for the protuberances which they formed, I might have passed

Fig. 22.
Engystoma carolinense Holb.

them by unnoticed. The body of this frog is short and oval, the total length not exceeding an inch. The head is small and triangular; the snout pointed, and the jaws toothless. Above, the body is dark, grayish brown, while below it is lighter, but thickly mottled with blackish specks.

Of the habits of this frog but little seems to be recorded. Holbrook says: "It passes most of its days in concealment near old fences or under the bark of fallen trees, emerging only toward evening and after heavy rains. It makes a feeble chirp at night, and at times when captured; and being but a clumsy swimmer, if thrown into the water it repeats this chirp frequently in its endeavors to escape."* On the contrary, Cope, in his "Batrachia of North America," says that "the cry is loud for the size of the animal." He reports it as very common in ditches along the streets of Houston and San Antonio, Texas, in September, and adds: "They are extremely shy and become silent on the approach of human footsteps. As only the tip of their nose projects above the water level, they disappear beneath it without leaving a ripple."† I afterward took it on two different occasions near Ormond, but beneath bark or rubbish some distance from water. It is the sole representative of its family in the United States, having been taken as far north as New Madrid, Missouri. Eighteen genera

* North American Herpetology, I, 1836, p. 84.
† Loc. cit., 1889, 386.

and fifty-three species have been described from other countries, chiefly from the tropics.

I also took to-day a male of the six-lined lizard, *Cnemidophorus sex-lineatus* L. I had seen them on several previous occasions, but their movements were so rapid that I had been unable to capture one. Its habits here are the same as among the sand dunes at the foot of Lake Michigan, where it occurs plentifully. Here, as there, they are always seen in sandy localities, scampering swiftly from one clump of bunch grass to another; so swiftly, in fact, that a great deal of maneuvering is necessary to capture one with a butterfly net. The specimen taken to-day is dusky brown in color, with three yellow streaks on each side, the interspaces being jet black. The throat is silvery white, and the abdomen a deep, shining blue. I have never seen it climb trees, as does the common blue-tailed lizard, *Eumeces fasciatus* L., though Holbrook states that "it will take to trees when pursued." He also adds that "it feeds on insects and generally seeks its food toward the close of the day, when it may be seen in corn fields far from its usual retreats; and, not infrequently, I have met male and female in company."*

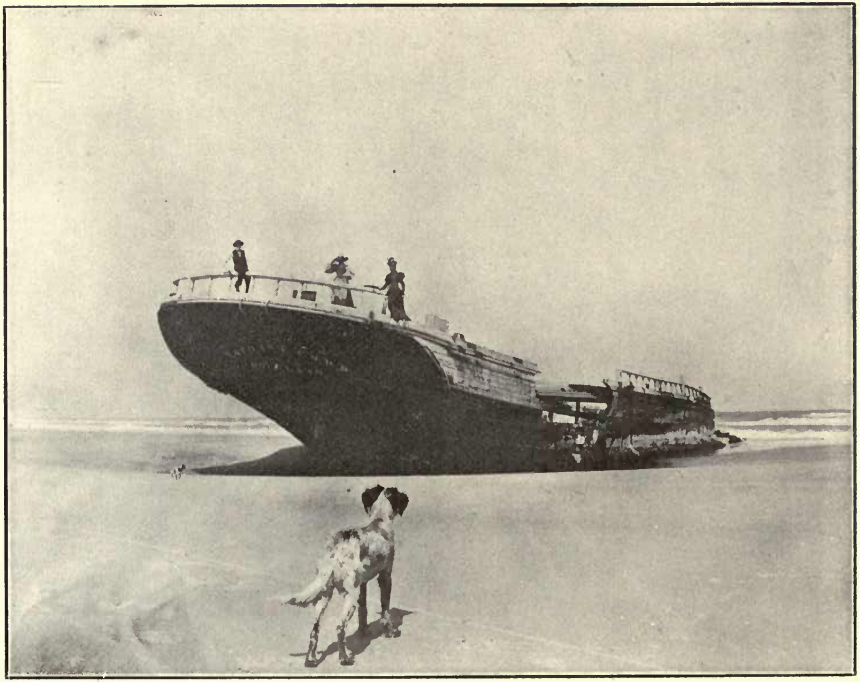
This afternoon, while excavating in the shell mound, a large cabbage palmetto, which had been undermined by the negroes who are carting away shells, fell into the excavation and missed me about ten feet.

* Loc. cit., p. 65.

March 19, 1899.—Raining in the forenoon. Along the river bank, in front of the house where I room, are several bunches of hay, which is composed of a mixture of stems of weeds and coarse bunch grass. It has lain there for several months. I turned it over between showers, and found several specimens of the field cricket, *Gryllus pennsylvanicus* Burm., and a male of a long-winged roach, *Ischnoptera bolliana* Sauss., neither of which I have seen here before. From beneath some near-by rubbish, along the sides of a rill which carries the waste of a flowing well to the river, I also secured several examples of that flat, discoidal snail, *Polygyra septemvolva* Say. The whorls are seven in number, compressed, depressed, and marked with conspicuous lines and grooves above. In color it is russet-horn, and the greatest diameter is three-fifths of an inch. Its range is confined to the Atlantic coast of Georgia and Florida. I afterwards took it beneath decaying palmetto logs and rubbish in a number of places near Ormond.

Another snail, of which I to-day secured a single specimen, beneath the rubbish by the rill, is *Polygyra pustula* Fer., a reddish, horn-colored and hirsute species, whose maximum breadth is but one-fifth of an inch. It is chiefly characterized by having a deep groove within the umbilicus, and ranges from Georgia to Texas.

In the afternoon, though the wind was blowing strongly, I once again visited the beach. The most



THE WRECK OF THE NATHAN F. COBB.

prominent object along the shore was the hull of a deserted ship about a mile below Ormond, which was wrecked on December 5, 1896. It being low tide, I easily reached it and climbed to its deck. It had been a three-masted schooner, about one hundred and twenty feet in length. One mast had been sawed off, the other two snapped by the storm which drove the vessel stern first upon this coast. Two of her crew were swept overboard and drowned before she struck, and a landsman was also drowned while striving to rescue the remainder of the crew, who were finally saved. On the side of her prow is the name—Nathan F. Cobb, of Rockland, Maine. Her hull lies deep in the sands. At high tide the ocean, proud of his power, breaks over her. Vultures and fish hawks at times rest upon the stubs of her broken masts. Curiosity-seekers like myself by hundreds come and go. There she will probably lie for years to come, the only wreck of any importance along this coast for 50 miles.

March 20, 1899.—The night has been cool, but the sun rises bright and glorious from the bed of the ocean. There is but here and there a dimple on the surface of the river. Its waters are flowing placidly onward to the sea. The waters of a man's life are his days. Like those of a river, a lake or the sea, they are at one time calm, placid and slow moving. At another, they are tossed into foam, into high waves, and

are driven on by adverse winds in rapid, tumultuous course.

The large glossy evergreen leaves of the magnolia, *M. grandiflora* L., are the most handsome foliage of the woods hereabouts. Large numbers of them have recently been used in decorating the office and hallways of the great hotel across the river.

One seeks the sunny places in the woods and fields at noon to-day, as the mercury is only at 50° F. About 75° is the most pleasant in this latitude. Above that is depressing.

The dragonflies which occur here differ much in habit from those in the north. There they are seldom seen except about marshes and borders of streams and ponds. Here they seem to seek the higher, dryer, woodland paths. This morning I have seen hundreds of the medium-sized, brown-winged form, *Tramea carolina* L., flitting hither and thither in active flight. Many others of the same species are resting on the twigs of oaks and other trees, their bodies standing out at right angles to the support to which they cling. This species occurs most abundantly along the sea coast, but ranges inland as far as the Great Lakes.

I to-day saw the first colony of the young of that giant lubberly grasshopper *Dictyophorus reticulatus* Thunb. There were about seventy of them on the leaves and stems of a single weed in the old orange orchard. I also secured a magnificent specimen of

that great black and yellow butterfly, the tiger swallow-tail, *Papilio turnus* L. Many have been seen, but the freshly moulted ones fly high, those next the

Fig. 23—Tiger Swallow-tail.
(Two-fifths natural size.)

ground within reach of the net being almost always worn and be-draggled. As yet the dimorphic form *glaucus* has not been seen, though the books say it is "southern in its range." But the books are not always right. Too often are they written by closet naturalists, who depend upon others to gather their specimens and first-hand knowledge.

March 21, 1899.—For two nights I have slept but little. The old nervous feeling is upon me with full force. This morning I fish for an hour from the bridge, where many sea trout, *Cynoscion nebulosus* Cuv. & Val., and sailors' choice, *Lagodon rhomboides* L., have recently been taken. I, however, get "nary a nibble."

I afterwards spend some time searching beneath the loose bark of old pine logs in the woods, northwest of town, but find little other than what I have taken. Beneath this bark is the favorite abiding place of the blue-tailed skink, *Eumeces fasciatus* L. Here, roaches, ants, and other lizard delicacies are common. Here is protection from frost and from birds of prey. At least a dozen were found beneath this pine bark shelter during my morning's search. Here, too, abides the pretty little ring-necked snake, *Diadophis punctatus* L. A specimen taken this morn-

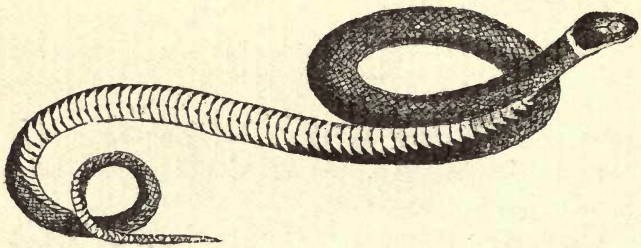


Fig. 24—Ring-necked Snake.

ing differs from those of the north in having the ring about the neck salmon red, instead of creamy white. It is but eight inches in length; above, blue-black in color; below, bright orange, with two lateral rows of blackish blotches, and a median row of similar spots between the head and tail.

In the afternoon I take my way to a grassy slope beyond a large, vacant house. Here I bask, like a

lizard, for two hours or more, in the sun's light and heat. Do I store up any energy? I know not, but it is pleasant to be able, on a March day, to stretch myself upon this sloping grassy spot and feel the warm rays beat upon my cheek.

I bow my head in reverence before thee, O Sun, my master! Thou art King and Lord of all! From thy face beams a radiant light which quickens into new life all forms of organic beings. The sap in bud, in herb, in tree, obedient to thy will, becomes more liquid, mounts faster, reaches the farthermost cells, and shortly builds new ones to receive thy precious rays. The blood in animals becomes possessed with new energy, and bounds impulsively through the veins. Thou strengthenest the weak, thou curbest the strong. Thou art the source of all energy, the fountain of all life. Why, then, should not I, this afternoon, receive new powers from thy effulgent rays?

March 22, 1899.—The morning dawns clear and warm. By ten o'clock the temperature is 82°, and the blue of the sky intense and dazzling.

An old man cleaned the yard for Mrs. B. this morning, who came to Florida a few years ago with $2,200, his life savings. He invested $1,000 of it in three acres of land near Ormond, one of which was already set out to orange trees. In clearing and planting the other two acres he spent $500 more. The second year after, the frost killed all his trees. He is thus

left with only $700, and works at odd jobs for a living. Moral, beware of orange groves in north Florida. The climate of this part of the State is delightful, but it is not coupled with an abundance of good soil. It is a fine place to live or to winter if a person has money which he has made somewhere else. Most of those who make a living here get it by catering in some manner to the wants of invalids or tourists from the north, not by raising fruit, crops, or by manufacturing.

In the old orange orchard I found the male of the parti-colored sand locust, *Scirtettica picta* Scudd., more abundant than at any time before. He has the most prolonged stridulation of any locust known to me. He zig-zags in his flight almost at right angles, sometimes staying in the air for half a minute, flying all about an acre or more, and finally alighting on the sand within a yard of where he arose. All the time he is up he sounds his musical organ with every stroke of his wings, making a loud z-rr-zrr-zrr, like the subdued note of the harvest fly, *Cicada pruinosa* L., or the prolonged and angry buzz of a big bumble bee. This locust has been recorded only from Georgia and Florida, though it will doubtless be found farther north in sandy fields close to the coast.

A few days ago a darkey brought to the house while I was away a mole cricket, *Gryllotalpa borealis* Burm. This morning I met him for the first time since, and told him what it was and something of its

habits. He said he has seen hundreds of them when plowing along the edges of the hammocks. This darkey and most of his race hereabouts often greet me, whatever the time of day, with the alliterative phrase, "Mawnin', mister."

Fig. 25—Mole Cricket. (Natural size.)

In the afternoon I went with a party to the shell mound. On the way we happened upon a small spreading viper, *Heterodon platyrhinus* Lat., in the sandy roadway. It was very brightly colored and about fourteen inches in length. On first seeing us it hissed and spread itself out very flat, but soon attempted to escape. When headed off, it turned over on its back and went through some remarkable squirming vibrations, twisting and writhing into every conceivable form, as though suffering from a most severe case of snake epilepsy. Finally, with mouth wide open, it became perfectly quiet, feigning death in every particular except when turned right side up, when it would immediately squirm over again. We left it apparently lifeless, but on returning, a half hour later, it was gone. This curious habit of feigning death when teased is seemingly peculiar to the spreading viper, and is practiced by both young and old.* This snake is said to be common

*See Jour. Cincin. Soc. Nat. Hist., 1891, p. 33.

about Ormond, though the one above mentioned was the only one I saw. It is thought by most persons that it is very poisonous and can even spit venom. It is, however, one of the most harmless of snakes, possessing no sign of a poison fang.

March 23, 1899.—The forenoon is hot and sultry. I overturned once more the hay on the river bank, and was rewarded with a specimen of a roach, *Pycnoscelus surinamensis* L., which I have not before found. It is of medium size, three-quarters of an inch in length by two-fifths of an inch in breadth. The wings are light smoky brown, slightly longer than the abdomen, while the head and pronotum are dark shining brown, the latter narrowly margined in front with yellow. It is said to be abundant in the tropics of both hemispheres; and in the United States occurs in the Gulf and South Atlantic states.

Among plants now in blossom hereabouts, I notice an old northern friend, the Carolina cranesbill, *Geranium carolinianum* L. It is common in waste places along the roadways and in old fields, as is also that handsome, hairy, purple phlox, *Phlox amœna* L. The latter was noticed on March 5th, and is said to bloom all winter when the season is favorable. I first became acquainted with it a dozen years ago in Monroe County, Indiana, where it reaches its northern limit.

The big green dragonfly, with spotted abdomen, *Æschna ingens* Ramb., is out to-day by thousands.

Its flight is so swift that one can scarcely follow it with the eye. The only way I can catch them is by striking wildly at them with the net as they come along. It is like striking at a base ball pitched with exceeding swiftness. I can always tell when I have made a capture by the thud with which it hits the bottom of the net.

The "red-bug" has shown its colors, or, rather, its bites. My ankles are sore with the eruptions due to their burrowing. From what I can see of them they are only the northern jigger, *Leptus irritans* Riley.

This is a minute reddish insect, belonging to the group of mites. In the larval form, the one in which

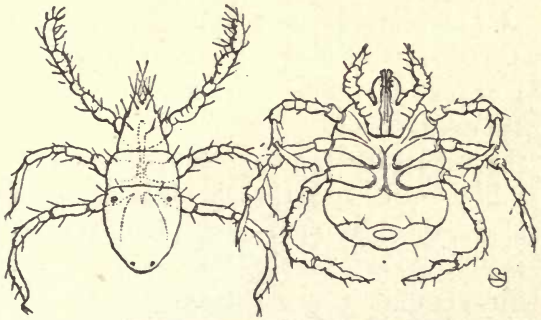


Fig. 26—Jiggers. (Two species.)
Leptus irritans on the right.
(After Riley.)

it occurs as a pest, it has six legs instead of eight, and a pair of very large maxillæ, or arms. Dr. Riley has given a popular account of this pest, as follows: "Woe betide the person who, after bathing in some

stream, is lured to a green dressing spot of weeds or grass! He may, for the time, consider himself fortunate in getting rid of mud and dirt, but he will afterwards find to his sorrow that he exchanged them for something far more tenacious in these microscopic harvest mites. If he has obtained a good supply of them, he will in a few hours begin to suffer from severe itching, and for the next two or three days will be likely to scratch until his limbs are sore.

"With the strong mandibles and the elbowed maxillæ, which act like arms, this mite is able to bury itself completely in the flesh, thereby causing a red swelling, with a pale pustulous center, containing watery matter. If, in scratching, he is fortunate enough to remove the mite before it enters, the part soon heals. But otherwise the irritation lasts for two, three, or four days, the pustulous center reappearing as often as it is broken.

"The animal itself, on account of its minute size, is seldom seen, and the uninitiated, when first troubled with it, are often alarmed at the symptoms, and at a loss to account for them. Fortunately these little plagues never attach themselves to persons in such immense numbers as do sometimes young or so-called 'seed' ticks; but I have known cases where, from the irritation and consequent scratching, the flesh had the appearance of being covered with ulcers; and in some localities, where these pests most abound, sulphur is often sprinkled during 'jigger'

season in the boots or shoes as a protection. Sulphur ointment is also a good remedy against the effects of these mites, though when that can not be obtained, saleratus water and salt water will partially allay the irritation.

"Their normal food, apparently, consists of the juices of plants, and the love of blood proves ruinous to those individuals who get a chance to indulge it. For, unlike the true jigger, the female of which deposits eggs in the wound she makes, these harvest mites have no object of the kind, and when not killed by the hands of those they torment, they soon die victims to their sanguinary appetite."*

An excellent remedy for the bite of these "red-bugs" is the bathing of the affected parts in a very dilute solution of carbolic acid—one part of acid to fifty parts of water. Diluted alcohol can also be used to advantage.

In making a side excursion this morning, I got into a tangled mass of young pines, saw palmettos and scrubby undergrowth, which was the worst I ever encountered. 'Twas a veritable semi-tropical jungle. Long grape vines, smilax of various kinds and other thorn-bearing upright shrubs and twining vines everywhere impeded my progress. For half an hour I tried to force my way out before I was successful. I could not see twenty feet ahead for most of the

*Amer. Naturalist, VII, 1873, p. 18.

time. At last I came out, perspiring and well-nigh exhausted, into an old Spanish roadway.

Those little wood-brown butterflies, the *Neonymphas,* are very common to-day. *N. sosybius* Fab. has already been mentioned. *N. eurytus* Fab., somewhat larger, and with two eye spots circled with yellow, on both the upper and lower surfaces of each wing, is more common. *N. gemma* Hub. also occurs, but sparingly. The habits of all are the same. They are frail creatures of the earth — ever-moving—ever-flitting close to the ground in search of something, I know not what. Their brown wings shield them from the sight of bird and other enemy. Along woodland paths, in sunny lanes, for two weeks and more they have been the prevailing form of insect life. Rest, they seem to know not. Perchance for an instant one will pause with folded wing, and bask in the sunshine on some dry leaf; then up and away it goes, ever seeking, seeking, seeking o'er the face of Mother Earth. They are not gifted with living motion. They are but the shadows of dead leaves, driven onward before the breeze. So thinks, at times, the naturalist, as he, too, basks in the sunlight and sees their flitting forms go by.

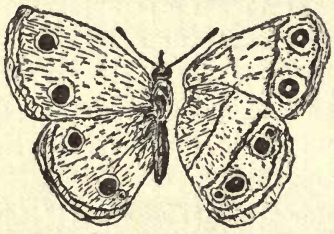


Fig. 27—Wood Nymph Butterfly.
Neonympha eurytus Fab.

Just after noon there was a gentle rain, with occasional thunder, for an hour and a half. Then a calm. Not a ripple upon the surface of the water, and the air cooler by ten degrees. All was fresh, peaceful and inviting in the fields. A pleasing woodsy odor mingled with that of the pines. The song of a cardinal, the cheery note of a wren, and the lisping call of two or three warblers alone broke the silence.

I watch for a time a warbler in a nearby scrub oak, flitting from branch to branch, and peering furtively

Fig. 28—Prairie Warbler.

on every side. Its back is olive, with several chestnut bars in the center. The under parts and throat are bright yellow. Black bars border the sides of head and throat. Is it the prairie warbler, *Dendroica discolor* Viellot, northward bound? If so, I would fain send by him a message to the loved ones at home.

March 24, 1899.—To-day I accompanied a party of excursionists on a gasoline launch up the Tomoka, or,

in the vernacular of the darkey, the "Mokey." We went as far as Misener's Landing, where the hotel people have erected a rude log cabin for the shelter and accommodation of such of their guests as choose to make the trip.

We first ascended the Halifax in the face of a strong, north head wind, for six miles, when we came to the broad mouth of the Tomoka, which enters from the west. On the way up the Halifax we saw a number of cormorants, *Phalacrocorax dilophus* Swainson, perched on the poles or posts erected along the stream as channel guides for the pilot. They would sit motionless, with necks far outstretched until the boat was almost opposite, then move onward close to the water, in long, lumbering flight, to a distant perch. Several flocks of "bluebills," or scaup ducks, *Aythya marila* L., were also flushed, their white sides and backs as they flew disclosing their identity.

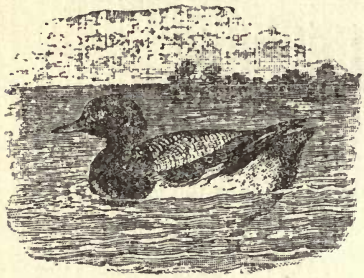


Fig. 29—Scaup Duck.

The mouth of the Tomoka is a third of a mile in width and very shallow, but after fairly entering the stream it narrows to one hundred and fifty yards or

less, and the water becomes very dark, almost black, and deep. Rounding a bend we saw lying on the bank our first live alligator on his native heath. He was ten feet or more in length, and an ugly looking varmint from any point of view. Several kodak snap-shots were obtained of him as the boat went by a half-dozen rods from where he lay blinking in the sun. We had not fairly gotten past when, with a clumsy plunge, he went headlong into the river and disappeared beneath its turbid waters. A little farther on the eyes and tip of nose of another "gator" were seen close to the shore and just above the level of the water. They sunk slowly and silently as we drew near. But two others were noted during the day, the air being too cool to suit their sunning proclivities.

A number of "cooters," or large greenish turtles, *Pseudemys concinna* LeConte, were observed, always solitary, resting on half submerged logs in secluded nooks along the shore.

The Tomoka makes many crooks and turns, often abrupt. Like most other streams, one bank is usually the lower, being the border of a flat marshy tract covered with reeds and coarse grass; and with willows, cypress and cabbage palmettos close to the water's edge. The other bank is six to ten feet higher, the surface sandy, and covered with pine and saw palmettos in abundance.

Numerous ospreys or fish hawks, *Pandion haliætus* L., were seen both on the going and returning trips. One of them had a large fish in its talons, so held that the head of the fish was toward the head of the bird, so as to retard the latter as little as possible in its flight. It flew before us for a mile or more, alighting at intervals of a few hundred yards on some dead

Fig. 30—Osprey or Fish Hawk.

limb of cypress or oak; then, on our near approach, up and away, always clinging tightly to its prey.

Among the most striking objects along the river are the nests of these ospreys—great circular masses of mosses and twigs—placed far out on the projecting limb of some dead snag, safe from the clutches of any egg-collecting urchin, or other animal with oölogical propensities. The sticks of the nest alone form a large mass, serving as a foundation; but when the nest is finished are so completely covered with the

gray Spanish moss as to be almost out of sight. It is said that the birds collect the materials of which their nests are made from distant places, when they might easily secure them within a few rods of the tree on which they are placed. One of the nests was as large as a bushel basket, and is said to have been occupied each season for fifteen years, or since the Tomoka was first visited by the tourists, and for how much longer man knoweth not. It is lined each spring with new moss, and otherwise put in repair. To-day the head of the sitting bird was just visible above its rim. The season of incubating was evidently in its height as one of the birds was either sitting on each nest noted, or was standing on its edge, while the other was usually perched on a nearby tree.

Going up the stream until fallen trees formed a barrier against further progress we turned the bow towards home and retraced our way to Misener's Landing and the cabin. Here a high piece of sandy ground, free from underbrush—a pine-barren, in fact —stretches back from the river, far as eye can reach. It is covered with a tall species of wire grass, *Aristida stricta* Michx., now brown and sere; while numerous examples of the long-leaved pine, *Pinus palustris* Mill., are scattered over its expanse. It was the first open pine woods I had had opportunity to visit, and while the others of the party amused themselves about the cabin, I rambled afar, seeking what I might find, in this southern woodland pasture.

It seems that at this season the name of "barren" applies as well to the animal as to the vegetable forms of life, for the former were few and far between. Four species of beetles taken from beneath chunks and fallen limbs alone rewarded me for the two hours' search. The largest was *Pasimachus marginatus* Fab., an oblong black carabid an inch in length, of which two specimens were taken. Another and rarer species was *Helluomorpha ferruginea* Lec., a uniform brown form which is not recorded in any Florida list. The others are *Tenebrioides semicylindrica* Horn, a cylindrical, elongate black species which is also rare, and *Phaneus igneus* MacL., a "tumble bug" closely allied to our common northern *P. carnifex*.

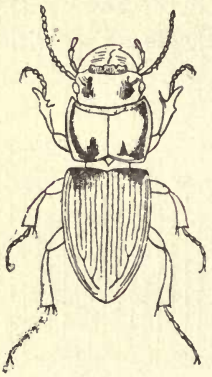


Fig. 31.
Pasimachus marginatus Fab.

Returning to the cabin, I partook of a "fish chowder," of which one small bass formed the fishy flavor; since the finny tribe had refused to sacrifice themselves for our hungry stomachs. Nevertheless, other viands were plentiful, and after an hour at the festal board, we started homeward.

On the way down stream a great blue heron, *Ardea herodias* L., seemingly of lighter hue than the same species in the north, was flushed a number of times. He would arise with a loud flapping of wings from

Pl. VI.

A View on the Tomoka River.

some cove or sheltered position where, for a minute or two, he had been hidden from view, and, extending his long legs straight out behind him to serve as a rudder in lieu of his short tail, he would flap his way onward for one hundred and fifty yards or more, then drop down behind a bunch of reeds. There he would stand motionless, with outstretched neck, watching and waiting for our approach, when again he would be up and away. The small green heron, *Ardea virescens* L., and the kingfisher, *Ceryle alcyon* L., were also seen at intervals along our way. Just before reaching the Halifax the boat, though drawing but twenty-six inches, grounded in the shallow water, and had to be worked off by shifting the position of the passengers and then using a pole. If necessary, we could have easily waded to the shore.

The Tomoka is a characteristic representative of the smaller Floridian streams; with its deep, dark, slowly flowing water; palmettos, pines and cypresses festooned with hanging moss, leaning far out over its depths; shining mullet leaping at intervals above its surface; alligators and turtles basking on its banks or on half submerged logs; and negroes humming with peculiar nasal twang their plaintive melodies, while rowing and fishing in its waters.

March 25, 1899.—Once more, O my pine tree, lifting thy head so proudly above thy surroundings—once more I come to thee, rest my head, weary with pain, against thy friendly trunk and give way to rev-

ery! I would not give much for a man who can look upon the first wild flowers of spring and not feel a love, a boundless love, of Nature in his soul. For to know God, the true God, the one universal and all, one must know Nature in the true sense. But few, if any, men have ever known her thus, for to do so is to know the relation existing between matter and force, between atom and molecule, between element and compound, between cell and tissue, between organ and system, between plant and animal, between each one of nature's objects and all the rest. It is to grasp, as it were, the universe in one grand comprehension—to stand on an eminence a thousand times higher than any on earth and see all objects in one grand vista before you; and at the same time feel and understand the workings of the great natural forces about you. Then, and then only, can one see and know his relation to all—feel that he is a part of the universal whole—a parcel of the universe—bound to it and kin to all which it comprises. For the Universe is God, and God is the Universe.

I pull the bark from a fallen pine, which lies half buried in the mold, and find the following inhabitants dwelling beneath its shelter: One rather large, blue-tailed lizard; two toothless frogs, *Engystoma carolinense* Holb.; several specimens of a carabid beetle, *Anisodactylus terminatus* Say; a number of beetle larvæ; several species of ants; a large cockroach, *Eurycotes ingens* Scudd.; numerous young of another

roach; a half dozen earwigs, *Labia burgessi* Scudd.; a colony of "white ants;" two centipedes, *Scolopendra morsitans* L.; two large millipedes, *Spirobolus spinigerus* Wood, and several smaller myriapods, members of the genus *Lithobius*. It was surely a "happy family," living seemingly in peace and unity beneath the bark of the old pine log.

The true myriapods are always to me a group of more than passing interest; since they are the typical representatives of that great branch of Arthropods, which comprises all insects and crustaceans. Active are they, and when the protective shelter of bark, chunk or chip is raised from above them, away they scamper, seeking another hiding place beneath some leaf or lump of mold. Handsome, too, are some of them, especially the long, slender Scolopendrid, with its clear bluish-green body. Their food, in the main, the juices of decaying vegetation, their lives are spent in and about these old logs in the midst of plenty. Perchance, at times, a shrew, salamander or carnivorous beetle covets the protoplasm which they have stored, and makes of them a meal; but, otherwise, methinks, the moments pass quietly, unnoted and unsung, until at last they yield back to Mother Earth the dust which is her own.

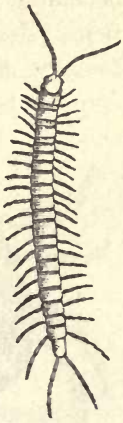


Fig. 32.
A Myriapod.

To-day I take for the first time a specimen of that little semi-tropical butterfly, the "tailed skipper," *Eudamus proteus* L. It expands about two inches; is dark brown in color, with four whitish spots on the fore wing, while the hind wings are without spots and are produced into tails about half an inch in length. It ranges as far north as New York City, and southwestward at least to the lower part of Old Mexico, where I have taken it in numbers.

The wood ticks, *Dermacentor americanus* L., are becoming common. They are often called "dog ticks," since dogs are their most common host. The females, when they attach themselves to the skin of man or beast, and are allowed to remain, become gorged with blood until they are very much swollen, and are sometimes a full half inch in length. The males are quite handsome, as handsome goes among such forms, being velvety brown and having the body above and the legs marked with silvery lines and blotches. They do not enlarge as do the females when gorged with blood, though, if removed and the head left in the flesh, a bad running sore is apt to result. The

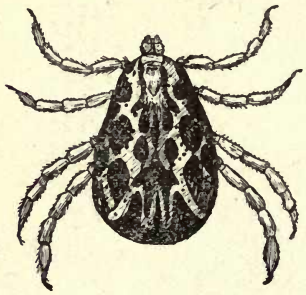


Fig. 33—Wood Tick.
(Male; much enlarged.)

young, called "seed ticks," are in these southern woods very plentiful and irritating, climbing on to the leaves and branches, from whence they are brushed on to one's clothing.

In passing through these upland pine woods and hammocks, one often notes a small brown tail wiggling and just disappearing beneath a bunch of dead leaves or a fallen giant leaf of the cabbage palmetto. Investigation will show the tail to belong to the ground lizard, *Oligosoma laterale* Say. Above, the body is chestnut brown; below, silvery white to base of tail, where the white merges into blue. A band of black begins at the snout and runs back along the side to the middle of tail. The total length is usually less than five inches.

The ground lizard is our smallest saurian. When undisturbed, it is a slow moving, tail-wagging, wriggling-onward reptile, but when frightened, it moves

Fig. 34—Ground Lizard.

with much celerity and quickly finds a shelter. Holbrook has well described its habits as follows: "The

ground lizard may be seen by thousands in the thick forests of the southern states. They emerge from their retreats after sunset, in search of small insects and worms, on which they live; yet their motions are so quick and they disappear so rapidly, that they might at first be easily mistaken for crickets or other insects. Though so numerous, it is difficult to secure them alive; for when approached they conceal themselves with astonishing quickness under the roots of the old and decaying trees, or beneath fallen leaves, or other vegetable substances. This decaying vegetable matter sometimes forms a stratum several inches thick, containing numerous holes and crevices, to which they can easily retreat. We have never observed it ascend trees in its attempts to escape when pursued."*

March 26, 1899.—The early morning was damp and misty. About nine o'clock the sun beamed forth and, aided by a strong breeze, dispelled the fog. I made my way westward toward the old chimneys. Near the railway I saw the body of a wild cat, *Lynx rufus* Guld., which had evidently been killed last night by a train. This mammal is said to be still frequent in the hammocks and denser forests, but seldom approaches so closely to the town. Its range appears to be the whole of North America.

Beneath a chunk in the sandy roadway were a dozen or more gigantic millipedes of the genus *Spir-*

*N. Am. Herp., I, 1836, p. 72.

obolus, coiled up in burrows in the mold and sand. They are the largest examples I have yet seen, being four and a half inches in length, grayish brown in color and with a median row of small reddish spots along the dorsal surface.

On the leaves of the saw palmetto, I find occasionally a small and very handsome Chrysomelid beetle, which adheres to the leaf so closely that I can scarcely pull it away. It is one of the tortoise beetles, *Porphyraspis cyanea* Say, deep violaceus blue in color, and less than one-quarter of an inch in size. The thorax is emarginate in front, so that the head is visible from above, while the outer wings and thorax contain numerous large pits or punctures. A single example of a closely allied, but larger form, *Chelymorpha argus* Licht., not before listed from Florida, was also taken from a leaf of a convolvulus plant. It is reddish brown, with vestiges of small black spots, on wings and thorax, and is much smaller than in Indiana, where it occurs frequently on the leaves of bindweeds. The spots are also much larger in the northern specimens. They are seventeen in number, so that by Say the insect was described as *C. 17-punctata.*

In the old fields and pine-barrens of this region one often sees a great mound of sand thrown up about the mouth of a large burrow, which resembles closely that of the ground-hog or woodchuck of the northern states. However, it is not the home of a mammal, but

of a dry land terrapin or tortoise, known as the "gopher," *Xerobates polyphemus* Daudin. This is a large, thick-bodied turtle, whose fore-limbs are especially strong on account of the centuries of subterranean digging in which its ancestors have engaged. In color it is an ash brown above, and yellow below. The head is darker, sometimes being almost black. Recent writers place its maximum size at fifteen inches, but Bartram, writing in 1791, said that "when arrived at its greatest magnitude, the upper shell is near eighteen inches in length and ten to twelve inches in breadth." It is possible that the size has decreased since he wrote. The few specimens which I have seen were less than a foot in length.

The gopher is herbivorous and both nocturnal and diurnal, being often seen feeding in the afternoon. Like the common northern box turtle, *Cistudo carolina* L., when disturbed it retracts its head and feet and hisses like a goose; but seldom snaps or attempts to bite. Both Bartram and Holbrook state that its flesh is used for food, but this does not seem to be the case in Florida. However, they and other turtles are often chopped up and fed to hogs and poultry. It is a common belief that the burrows of the gopher extend down to ground water, but Mr. H. G. Hubbard, who excavated several of them, says that the galleries are eighteen or twenty feet long in the sandy ridges remote from water, and that they descend in a straight course at an angle of 35°, and terminate abruptly,

usually in a layer of indurated subsoil, at a depth of eight or nine feet below the surface. Since but little has been written concerning the home of the gopher, and the companions with which it is surrounded in that home, I quote at length from Mr. Hubbard's interesting description, as follows:

"Like its European relative, the gopher is a very long-lived animal. That it may live more than one hundred years I am inclined to believe is true. Certain it is that a quarter of a century brings little or no change to a full-grown tortoise, and the oldest inhabitants in Florida can not tell of the beginnings of some of their burrows. Such ancient and well-established domiciles, with entrances always invitingly open, naturally serve as places of refuge for many animals, when hard pressed by enemies, or to night prowlers when daylight overtakes them far from their proper homes. Even the rattlesnake, according to popular repute, has a more than passing acquaintance with these cool retreats.

"A number of years ago I learned that the gopher has for a permanent guest, a sort of parlor boarder, as it were, a batrachian, commonly called the 'gopher toad.' Specimens of these I frequently saw on summer evenings sitting at the entrance of the burrows after the manner of toads, quietly waiting for their supper to come to them. On the slightest alarm these timid creatures leaped quickly back into the gopher hole and saved themselves, so that it was not until

lately that I succeeded in capturing a specimen, and found to my surprise that the so-called toad was a veritable frog. The herpetologists of the National Museum, to whom I have recently forwarded specimens, pronounce it the very rare subspecies *Rana areolata æsopus* Cope. Indeed, only the type specimen existed in the Museum collection, and of its habits nothing is known.

"The desire to know something more of the gopher and its associates led me finally to undertake the laborious task of excavating and thoroughly examining one of their burrows. Accordingly, in January, 1893, I selected one of the largest burrows near my winter home at Crescent City, Florida, and proceeded to open and inspect its inner recesses. The excavation was in the loose yellow sand of our pine woods subsoil, and when my exploration was completed, so large a pit had been dug that a coach and span of horses might have been swallowed up in it.

"I had not descended many feet along the course of the burrow when I found that the walls and, particularly the roof of the gallery, were alive with specimens of a wingless cricket* of the genus *Ceuthophilus*.

"I next caught a glimpse of a very diaphanous Staphylinid, but so agile was this beetle and so like in color to the surrounding sand that several specimens slipped in succession through my fingers and escaped

* Not a true cricket, but a member of the family Locustidae.—W. S. B.

me. In subsequent explorations I recaptured this insect, which proves to be a *Philonthus* hitherto undescribed, and remarkable for its slenderness of stature, its lack of color, and the distinctly subterranean appearance which marks a true cave insect and dweller in darkness. As I approached the end of the burrow, the sand became fairly alive with larvæ and imagoes of a small Aphodius beetle, also a colorless and undescribed species, very subterranean in appearance.

"At the extreme end of the tunnel I found the gopher, quiescent but not dormant and resting upon a thin layer of fibrous material, evidently the winter accumulation of its excreta, in which could be plainly discerned the coarser and undigested portions of the leaves and vegetation which formed its food. Beneath this layer the sand was mined in every direction with the burrows of insects, and I soon had a considerable collection, among which was a *Copris* beetle, which, from its size and general appearance, I took without doubt to be the universally distributed *Copris minutus* of our barnyards. But, upon comparison with the known forms of the genus, this proves to be quite a new and distinct species.

"Besides the main deposit of refuse matter upon which the animal was resting, I found several smaller deposits which had evidently been pressed aside and partly imbedded in the sand by the movements of the turtle. These were all centers of attraction for the dung-eating beetles, but I found lurking in one of

the masses a number of lepidopterous larvæ an inch or so long. Their dusky brown coloration so closely corresponded with the material in which they lay concealed that I would probably have overlooked them had not their lively antics, their wriggling and twisting when disturbed, made them very conspicuous objects.

"Only three burrows were opened in January, and of these one alone was inhabited by the gopher. In the month of July following, I examined a larger number of gopher burrows, and in all eight galleries were carefully and thoroughly explored. The midsummer explorations greatly increased the knowledge previously gained of the habits of the gopher insects and added several new forms to the list."*

Altogether, Mr. Hubbard found one frog and thirteen species of insects living with the gophers. Of the insects, eight were beetles, and of these seven were species new to science. The other was the only beetle found living with the gopher which also occurs above ground. Besides the beetles, the insects collected were a deltoid moth, the wingless "cricket" above mentioned; a pseudo-scorpion and two species of ticks. All of these but one were undescribed. Thus it will be seen that this interesting association of messmates and parasites of the gopher forms a distinctively underground fauna in which the beginning of true cave life is very instructively shown.

* Insect Life, VI, 1894, p. 303, et seq.

The sand fly, or gnat, a minute grayish midge, less than one-sixteenth of an inch in length, has made its spring appearance. Its bite is sharp and penetrating, and, when present in numbers, it is one of the worst insect pests along the coast.

Though news of a great storm of snow and sleet has come to us from the north to-day, the air, sun and vegetation here is like that of mid-May in central Indiana. Here in this clearing in the woods is peace and quietude. Naught but the occasional hum of a mosquito and the soughing of the wind through the pines doth break the solitude. How strange it seems that but a few hours' ride will take us into a land of piercing cold and drifting snow, when here is a perfect sky, with the sun shedding his blessings o'er all his subjects with a kindly spirit. No snow, no ice, no leafless, lifeless trees, no drooping flowers are here to-day. Nothing but joy and sunshine and gladness are the portion of nature's objects.

March 27, 1899.—This morning I breakfasted early and then trudged along the railway for three miles or more to the bridge across the Tomoka River. A heavy dew and cloudy skies at first surrounded me, but the rays of "old Sol" soon dried the dew and scattered the clouds.

At nine o'clock I am sitting in the shadow formed by a bold, overhanging cliff of coquina limestone, a natural concrete made from finely ground beach shells, cemented by carbonate of lime. 'Tis a sub-

stance well nigh indestructible, of which were built the oldest forts and houses by the Caucasians in America, those of the first settlers at St. Augustine. 'Tis the first cliff of any kind I have seen in Florida. I rest my back and head against it and gaze down at the dark waters of the Tomoka, deep, shadowy, slow flowing. At my right is a cabbage palmetto, lifting its crown of leaves fifty feet above me. Bending far out from the edge of the cliff and o'erhanging the water is a live oak, unwedgeable and gnarled, its branches clad here and there with long pendent tufts of gray Spanish moss. Polypody ferns and poison ivy spring from the crevices along the face of the rock. A handsome climbing vine, with compound evergreen leaves and red trumpet shaped flowers two inches in length, twines among the tree tops and sprangles over

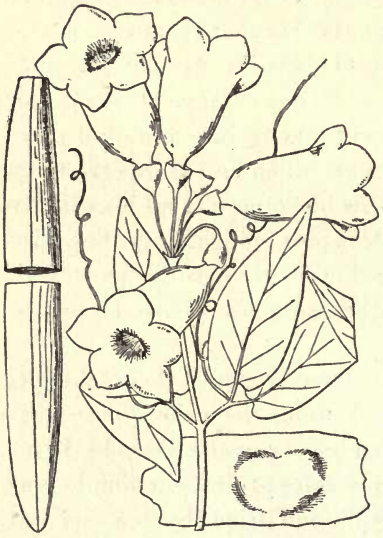


Fig. 35—Cross Vine. (After Britton.)
(Showing flowers and fruit pod two-fifths natural size.)

Pl. VII.

THOMPSON'S CREEK—A TYPICAL FLORIDA STREAM.

As seen from the Old Causeway.

the face of the cliff. 'Tis the cross vine, *Bignonia capreolata* L., own cousin to our northern trumpet creeper, and bearing the latter company as far northward as the valley of the lower Wabash. Several red cedars of large size add a tinge of somberness to the scene. All is as quiet as the grave. No song of bird, no hum of insect breaks the solitude.

Bartram accounts for the dark hue of the water in these southern lowland streams as follows: "In all the flat countries of Carolina and Florida, the waters of the rivers are, in some degree, turgid, and have a dark hue, owing to the annual firing of the forests and plains; and afterwards the heavy rains washing the light surface of the burnt earth into rivulets, which rivulets running rapidly over the surface of the earth, flow into the rivers, and tinge the waters the color of lye or beer."*

It is probable that the vast amount of decaying vegetation in the low hammocks has also much to do with the color of the water, since the rills and brooks from these hammocks feed, for the most part, the larger streams. Wherever a spring issues from bank or cliff, or wells up from far below the surface, the water is as clear as in our northern springs.

A water snake wriggles and squirms its way through the darksome waters, headed toward the opposite shore; but when a third of the way across turns tail and returns to its mate. It may be the cotton-

* Loc. cit., p. 223.

mouth, *Ancistrodon piscivorus* Holb., whose bite is reputed more poisonous than that of the diamond rattlesnake. It may be a harmless *Tropidonotus*. I am too far above it to determine which.

A sign board on a tree on the crest of the cliff states that "This is Buckhead Bluff, the site of the old ferry of the 'King's Road,' constructed by the English 150 years ago from St. Mary's, Georgia, 400 miles southward into Florida." What care I for that? 'Tis a bluff of stone in a land where bluffs are almost unknown. 'Tis something akin to those ledges which I have climbed time upon time in days of yore.

I note the body of a butterfly lying beside me and its presence begets a revery on death—that death which cometh to one and all in some form—which is as inevitable as the rising of to-morrow's sun. Whether it comes to the mansion of the rich, where every desire of the invalid is granted, or to the hovel of the hermit, where solitude is its only companion; whether it comes in the cool shade on the mountain's side, or in the burning glare of the noonday sun on a desert waste, it matters little; it can come but once. Peace and forgetfulness are its accompaniments. All hopes, all fears, all hatreds, all loves, all desires, all passions, become forever things of the past. The step is taken into the great unknown. Millions, aye, hundreds of billions of human forms, of plant and animal forms, have gone—not one has e'er returned to tell us of the way. All concerning it is guess work. The

wisdom of years' experience stored in the gray matter of cerebral cells availeth nothing. The clay—the matter—is left behind. The living part—the energy—passeth beyond. Like that heat which, transmitted into electric power, propels a car, and then, by friction, passes into space, so the energy of all living forms joins that sum total of all energies, which pervadeth the universe. The thoughts which man has inscribed, the good which he has done to his fellow-man; the ambitions, the loves, the hopes which he has inspired, are left and become a part of the world's wealth, for the future use of mankind.

He who can get his pleasures during life from simple, common things, is the happiest, the richest. If the song of bird, the habits of insects, the colors of flowers and the graceful forms of leaves afford me material for thought and reason, and lead to my contentment, I am most fortunate. Then, O Nature, let me be a devotee to thee while life remains! For, when death calls and forgetfulness of thy charms becomes my lot—

"Thy womb once more shall shield thy child within,
And I shall be what I before have been,
A part of thee, by thee caressed,
My first beloved, my last, my best,
My mother, mother Nature."

March 28, 1899.—The day, hot and sultry, the mercury at 82° F. at breakfast time. I don my thinnest coat, and clad only in that garb which I wear on

hottest day in midsummer, I sally forth—to bathe in the sunshine and inhale full inspirations of pure air —the two chief blessings which this land offers free to all who come.

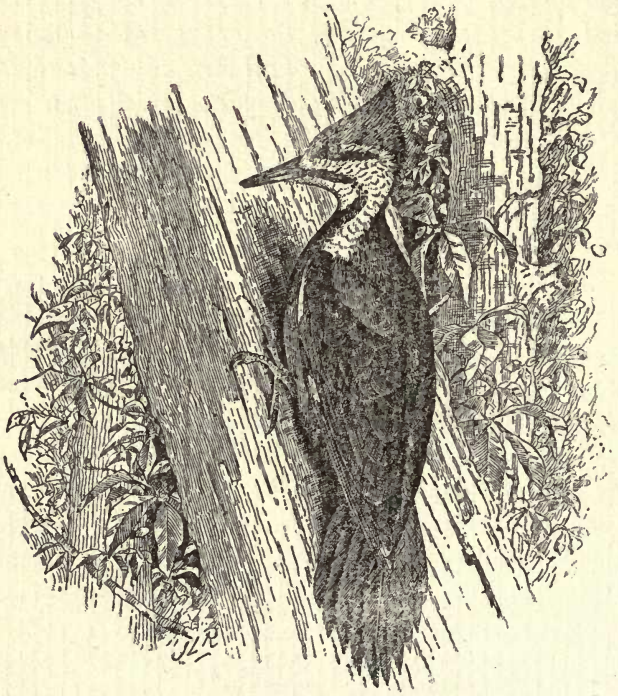


Fig. 36—Pileated Woodpecker. (After Beal.)

On my way toward the shell mound I note the galloping flight of that king of woodpeckers, *Ceophlœus pileatus* L. In great, long sweeping curves he moves

onward. What a power in his pectoral muscles! Alighting on an oak and glancing about, his eagle eye soon perceives me—a supposed enemy. His crest, redder than arterial blood, is erected, stands straight up. He hops upward along the branch, gives an involuntary peck or two, but all the time I am the cynosure of his eagle-like glances. He moves part way around the limb on which he rests, then, as I take a step forward to get a better view, he is away in that strong, unerring, galloping flight, to the deeper shades of the forest. A few moments later I see another. Here in the forest primeval they hold their own. Here they cope with all enemies. Here they fight successfully the battle of life. Their ease of movement, their independence, puts, for the time being, new hope in my heart, new courage in my soul. Why may not I be as full of spirits, as free of flight, as independent, as this creature of the air, this woodpecker, the pileated?

Yesterday afternoon I ran across a new locust in the old orange orchard, where I have found the first specimens of most of the Orthopterans I have taken. The males were most abundant; the females just moulting for the last time. It proves to be *Melanoplus propinquus* McNeill, closely allied to the common northern *M. femur-rubrum* DeG. It is a slender bodied, long winged species, dull in color, but graceful in movement. They are active leapers, flying noiselessly for several rods, and then settling down

upon a bunch of grass, the color of which is grayish brown, like that of their backs.

A long-winged male of the common field cricket, *Gryllus pennsylvanicus* Burm., is taken to-day. This appears to be the only species of *Gryllus* hereabouts at this season. The short-winged form is much the more common, but four of the long-winged ones being taken during the whole of my collecting. The species ranges over the whole United States, and varies much in size.

Fig. 37—A Field Cricket.
Gryllus pennsylvanicus Burm.

I note the remains of ferns high up on the cabbage palmettos, among the "bootjacks," just below the crown of leaves. There they found nourishment in the summer months, but the unwonted frosts have sapped their vitality and left them brown and sere.

If one wants peace and quiet, soothing sunshine and balmy breezes, here is his ideal resting place on such a day as this—here in a pine and palmetto grove, where the only sound is that of a falling leaf or creaking branch, and where the woodsy odor of pines is present day and night.

March 29, 1899.—Yesterday noon the mercury stood at 92°; last night at ten o'clock, at 80°; this morn, at five, it had sunk to 48°. Such are the changes to which one is subjected here in the "Land

of Flowers." It seems that spring here, as in the north, oftentimes lingers; like a coy maiden—now advancing, now retreating. Some of these days the coyness will be thrust aside, and with a mighty rush and joyous embrace she will enthrall us, and soon merge into the perfect woman—the June of summer.

To-day I walk to the Tomoka cabin at Misener's Landing. The way takes me past the "old chimneys," over a causeway wide and beautiful, which winds in and out among palms and palmettos, moss and dense foliage. This is succeeded by a mile of sandy road, bordered with underbrush, beyond which are the high, open pine woods. Scattered at intervals among the pines, is a scrubby live oak with dense evergreen foliage. Here and there is a pine snapped off in the breeze, but otherwise the woods are free from obstructions. 'Tis the long-leaved pine, *Pinus palustris* Mill., which flourishes in these barrens. The needles or leaves are at times eighteen inches in length. The stems of the young trees are scaly or scurfy to the top. This is the most common species of pine in east Florida, and the most valuable of all the pines growing in the southern states. From its lumber the houses and fences are mainly constructed, while from its sap or juice, ninety per cent. of the resin, turpentine, pitch and tar of commerce are obtained. It has a number of common names other than long-leaved pine, among which yellow pine, pitch pine, red pine and broom pine are the ones most

used. The specific name *palustris,* meaning, "swamp-growing," which was assigned to it when its habits were but little known, is a misnomer, inasmuch as the tree flourishes best on dry and sandy, rather than damp, soil. On account of the abundance and value of this pine, I have thought best to include herewith the following extracts from Michaux's excellent description of the tree and its products:

"The long-leaved pine is found almost without interruption in the lower part of the Carolinas, Georgia and the Floridas, over a tract more than six hundred miles long from northeast to southwest, and more than one hundred miles broad back from the sea. The mean stature of this pine is sixty or seventy feet, with an uniform diameter of fifteen or eighteen inches for two-thirds of this height. Some stocks, favored by local circumstances, attain much larger dimensions, particularly in east Florida. The bark is somewhat furrowed, and the epidermis detaches itself in thin transparent sheets. The leaves are about a foot long, of a beautiful brilliant green, united to the number of three in the same sheath, and collected in bunches at the extremity of the branches. They are longer and more numerous on the young stocks, which are sometimes cut by the negroes for brooms. The buds are very large, white, fringed and not resinous.

"The bloom takes place in April; the male flowers form masses of divergent violet-colored aments about

two inches long; in drying they shed great quantities of yellowish pollen, which is diffused by the wind and forms a momentary covering on the surface of the land and water. The cones are very large, being seven or eight inches long, and four inches thick when open, and are armed with small retorted spines. In the fruitful year they are ripe about the 15th of October, and shed their seeds the same month. The kernel is of an agreeable taste, and is contained in a thin white shell, surmounted by a membrane; in every other species of American Pine the shell is black. Sometimes the seeds are very abundant, and are voraciously eaten by wild turkeys, squirrels, and the swine that live almost wholly in the woods. But, in the unfruitful year, a forest of a hundred miles in extent may be ransacked without finding a single cone.

"The resinous products of the long-leaved pine are of five sorts, viz.: Crude turpentine, spirits of turpentine, resin, tar and pitch. The last two are delivered in their natural state; the others are modified by the agency of fire in certain modes of preparation. Crude turpentine is the sap of the tree obtained by making incisions in its trunk. It begins to distil about the middle of March, when the circulation commences, and flows with increasing abundance as the weather becomes warmer, so that July and August are the most productive months. When the circulation is slackened by the chills of autumn, the operation is

discontinued, and the remainder of the year is occupied in preparatory labors for the following season, which consist—first, in making the boxes. This is done in January and February; in the base of each tree, about three or four inches from the ground, and of preference on the south side, a cavity is formed, commonly of the capacity of three pints, but proportioned to the size of the trunk, of which it should occupy a quarter of the diameter; on stocks more than six feet in circumference, two, and sometimes four, boxes are made on opposite sides. Next comes the raking, or the clearing of the ground at the foot of the trees from leaves and herbage, by which means they are secured against the fires that are often kindled in the woods by the carelessness of travelers and wagoners. If the flames gain the boxes already impregnated with turpentine, they are rendered useless and others must be made. Notching is merely making at the sides of the box two oblique gutters, about three inches long, to conduct into it the sap that exudes from the edges of the wound. In the interval of a fortnight, which is employed in this operation, the first boxes become filled with sap. A wooden shovel is used to transfer it to pails, which, in turn, are emptied into casks placed at convenient distances. To increase the product, the upper edge of the box is chipped once a week, the bark and a portion of the alburnum being removed to the depth of four concentrical circles. The boxes fill every three weeks. After

five or six years the tree is abandoned; the upper edge of the wound becomes cicatrized, but the bark is never restored sufficiently for the renewal of the process.

"The crude turpentine, when distilled in large copper retorts, yields up about seventeen per cent. of its bulk in the form of an oil, known as 'spirits of turpentine.' This is the ordinary 'turpentine' of the drug stores. The residuum of the distillation is *resin*.

"All the tar of the southern states is made from dead wood of the long-leaved pine, consisting of trees prostrated by time or by the fire kindled annually in the forests; of the summits of those that are felled for timber, and of limbs broken off by the ice which sometimes overloads the leaves. To procure the tar, a kiln is formed in a part of the forest abounding in dead wood; this is first collected, stripped of the sap, and cut into billets two or three feet long and about three inches thick; a task which is rendered long and difficult by the knots. The next step is to prepare a place for piling it; for this purpose a shallow conical cavity is excavated in the side of a bank or hill, and a cast iron pan placed at the bottom, from which leads a spout into a barrel for collecting the tar. On this pan is piled the wood in a circle. The pile when finished is cone shaped—twenty feet in diameter below, and ten to twelve feet high. It is then strewed with pine leaves, covered with earth, and contained at the sides with a slight cincture of wood. This cov-

ering is necessary in order that the fire kindled at the top may penetrate to the bottom with a slow and gradual combustion. If the whole mass was rapidly inflamed, the operation would fail and the labor in part be lost; in fine, nearly the same precautions are exacted in this process as are observed in making charcoal. A kiln, which is to afford one hundred or one hundred and thirty barrels of tar, is eight or nine days in burning. *Pitch* is tar reduced by evaporation; it should not be diminished beyond half its bulk to be of a good quality."*

Far in the distance I hear a sign of civilization—the crow of a rooster. Long live his clarion voiced tongue! In the past it has guided me out of many a wilderness.

Beneath the dead bark of a pine snag, I take a large oblong Tenebrio beetle, *Polypleurus nitidus* Lec. It is black, with numerous rows of punctures on its outer wings, and is said to occur frequently in the pine woods of this region.

Once more I sit at the festal board on the porch of the Tomoka cabin, but sit alone. The merry party that gathered round this table on last Friday has scattered, never to meet again. And what of life have I learned since here we met? What of hope have I had? It matters little whether with party gay, or whether in solitude, one's conscience is ever present, one's memory is ever with him. The wind soughs

* North American Sylva, III, 1819, pp. 134, et seq.

A View from the Tomoka Cabin.

through the pines with mournful cadence and sets the long tufts of moss a-dangling. The wind blows more in Florida than any place I have ever been, but it is usually tempered with sunshine, and, therefore, less disagreeable.

But list—the sound of a human voice breaks my solitude—a woman's voice, clear and flute-like. I look around and find that a party of ladies have come out from my boarding house and have brought my lunch, as well as theirs. I need not, therefore, hurry away. I can turn over more chunks, explore more pathways, wend more slowly my footsteps homeward.

These sands on which I sit and which form the surface in these woods, could, if given the power of speech, tell a wonderful story. What was the birthplace of the silicon which forms their grains? Of what ledge of rock were they first a part? For untold millions of years, as man counts time, have they existed! Again and again have they been swept hither and thither by the forces of nature. Winds and waves have been the powers which have wafted them on—the steeds which have pulled them along. Were it not for the grass roots which now bind them together and hold them in place, the wind now blowing would send them scurrying before it. To-morrow's breezes might bring them back. Thus the area over which they would travel in a century might be only a small portion of the surface of the earth.

In the mold and sand beneath a chunk I find a worm-like snake, or a snake-like worm, I know not which. It is a foot in length and of a purplish flesh color; has a head covered with plates like a snake, but no eyes. The body is encircled with numerous whorls or rings, each of which, under the lens, is seen to be made up of many minute oblong plates. The tail is less than an inch in length and depressed above. On its upper surface the last dozen rings have their plates modified into transverse rows of tubercles. It resembles very much a gigantic fishing worm. It is quite lively, coiling itself about my fingers, in the same manner as does the brown worm snake, *Carphophiops amœna* Say, of the north, and darting forth its white tongue in true snake-like fashion.

On my way home I stop and rest for a while in the doorway of a deserted cabin in the midst of the pine woods. The floor and door of the cabin are gone. Window, it had none. The walls are of pine logs five to seven inches in diameter, unchinked, with a space cut through one of them for a stove pipe to protrude. It contains a single room, twenty-five feet square, and is roofed with pine clapboards. That it has long been deserted is evidenced by numerous young pines which have sprung up close about it.

What hopes, what fears, what ambitions, what despairs, what loves, what hates, have existed or have been engendered in this old cabin! What lives have here begun their existence? What souls have here

received their last unction before departing into the great unknown? Now the wild grape clambers o'er the roof. Chamæleons and blue-tailed skinks hide in the crannies between the logs. Cockroaches and centipedes crawl and creep beneath the beams which supported the floor. Here, in the midst of the pine woods, unfenced and unnoticed, the cabin stands. It was once a home to some contented soul, but now only the creeping, crawling creatures which I have noted make of it a temporary abiding place. Perchance, in time of storm, a hoot owl finds shelter beneath its roof and mocks the ghostly voices of its departed human occupants.

On arriving home I confer with my books, and am surprised to find that my chief capture of the day is neither a snake nor a worm, but a legless lizard, *Rhineura floridana* Baird. It is known only from Florida, having been described in 1858 from a specimen taken at Micanopy. It is called by the natives the "blind worm," or "blind snake," and is often exhumed by persons digging or grubbing in the gardens or plowing in the orange groves. Boulenger, in his "Catalogue of Lizards in the Brit-

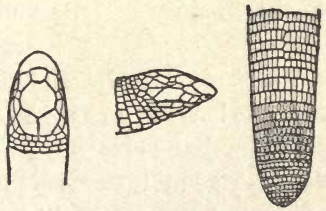


Fig. 38.

Rhineura floridana Baird.

(Top and side views of head and top view of tail, showing transverse rows of tubercles.)

ish Museum," enumerates sixty-one existing species of *Amphisbœnidae*, the family to which these curious snake-like saurians belong. Of these, thirty-eight are American, but one of which, the species at hand, occurs north of the Tropic of Cancer, though remains of a fossil form, *Rhineura hatcherii* Bauer, have been found in the Oligocene rocks of South Dakota.

As in most other subterranean and cave forms, rudiments of eyes are present, concealed beneath the skin. All the members of the family are burrowers, and many live in ants' nests. They bore narrow galleries in the earth, in which, like an earth worm, they are able to move backwards, as well as forwards. On the ground they progress in a straight line by slight vertical undulations, not by lateral movements, as in other limbless reptiles. The tail of many species is more or less prehensile. The food of all these lizards consists mainly of ants and other small insects and worms.*

March 30, 1899.—Seventy-two degrees at breakfast time! What a change from yesterday! It threatens rain, but rains not. The sky is overcast with clouds, yet, at intervals, the sun thrusts his countenance — here ever smiling — through the rifts and beams upon me. I take my way slowly to the base of the friendly pine. The tree sympathizes with me when human beings lack in sympathy.

* I afterwards took two mangled specimens of this lizard in the roadway near the shell mound; and since returning to Indiana, have had a number of specimens sent me from the vicinity of Ormond.

One hears, at long intervals, a tree creak, crack and fall in the pine woods. 'Tis probably some snag which the breeze has at last overcome. The noise startles one's soul. 'Tis a weird, uncanny sound. 'Tis unexpected, unlooked for. The creaking of the tree, as its roots are torn asunder, or its fibers broken, is not so appalling as the thud with which it strikes the earth. The latter is eager to once more clasp its form in her embrace; to have once more the carbon, hydrogen and oxygen of its bole and branches as part of her bosom. She leaps to receive it. Body of earth meets body of tree with equal fervor. Thud answers thud. 'Twill not be long till the juices of decay will rend the fibers of the fallen tree; not long till the elements now composing branch and limb will be scattered far and wide in fit condition to become once more a part of some organic being. The earth is ever eager to receive the dead or worn-out objects to which, in the past, she has given birth. More eager is she to put their bodies into such a shape that the elements can be used again. Thus does our common mother prepare and yield up sustenance for her offspring. Thus only is she able to renew her progeny —to cover her surface with new generations of living, active forms.

A little distance from my pine tree I find that these woods have been the scene of a great holocaust within the past few days. Myriads of living forms have been swept to their death by the demon—fire. It has

cleared the surface of underbrush as far towards the northwest as eye can reach. Saw palmettos are withered and dead. The boles of pines and cabbage palmettos are scorched to a dingy black, for a height of twenty feet or more. The charred remains of myriapods, turtles and snakes abound. Chewinks and other ground birds are lamenting their accustomed feeding places. All is ruin and devastation, and another woods must I seek in order to find recreation and life.

The so-called sea trout, *Cynoscion nebulosus* Cuv. and Val., caught from the bridge at Ormond, is not a

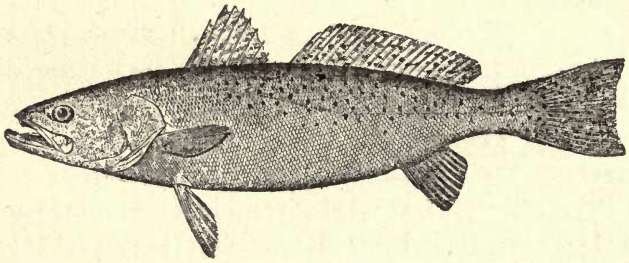


Fig. 39—Sea Trout.
Cynoscion nebulosus Cuv. and Val.
(From Bull. 47, U. S. Nat. Mus.)

trout, but a "weak fish," belonging to the family *Sciænidae*. It is probably called a trout on account of the many small black blotches which are scattered irregularly over its silvery sides. Mr. Bristol hooked one in the back to-day and succeeded in landing it, which weighed a little more than seven and a half

pounds. Its flesh is rich and delicate, and it is highly valued as a food fish. Mr. B., though seventy-four years of age, has killed with a rifle sixty-seven squirrels this past winter. Last year he killed one hundred and four, and the year before more than two hundred. All were gray squirrels—a third smaller than the same species in the north.

In the damp cleared area near the border of a hammock I found three species of "grouse locusts," belonging to as many genera. They are the smallest of our Acrididae, being, when full grown, less than a half inch in length. The thorax is prolonged as a hard crust, covering the wings and body. They pass the winter, as mature insects, beneath logs and rubbish and are to be seen leaping actively about on any warm sunny day, even in mid-winter. One of those taken to-day, *Paratettix rugosus* Scudd., is a strong and active flyer.

Fig. 40—A Grouse Locust. *Tettigidæ lateralis* Say.

With these little acridians I also found a number of those small, sand burrowing crickets, *Ellipes minuta* Scudd. They likewise are the smallest of the crickets found in North America, as when full grown they are but one-fifth of an inch in length. The fore tibiæ are much enlarged, as is the case with all burrowers which possess limbs. They live in little pits in the sand, from which they venture forth a short

distance in search of food. When disturbed or frightened they are powerful leapers. I have seen them jump to a height of five feet, and to a distance as great. Three known species occur in North America, the other two belonging to the genus Tridactylus, being nearly twice as large as *E. minuta.** This dwarf form ranges as far north as central Indiana, where it is common. It is dark brown in color, with the legs banded and thorax spotted with white.

Fig. 41—Ajax Butterfly.
Papilio ajax L.

Specimens of the Ajax butterfly, before mentioned, were secured to-day for the first time, and prove to be the variety *floridensis* Holland, characterized by the

* S. H. Scudder, Psyche, Feb., 1902, p. 309.

greater breadth and intensity of the black bands on the upper side of the wings. It appears to be rather common in this region during March.

March 31, 1899.—To-day the sun shone brightly, and Mr. B. and I rowed two miles up the Halifax and landed on the peninsula. On the way up we rowed through a school of mullet, and one of them leaped into the boat. While the boat was at anchor a second jumped into it, and on the way back a third did likewise. This one began jumping sixty or eighty feet distant, and after giving six great leaps, clearing each time eight to ten feet of water, essayed a seventh, and landed squarely between us. Mr. B. had already told me of going out at night with another party and a

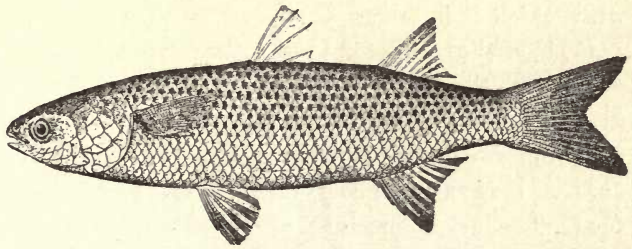


Fig. 42—Mullet.
Mugil cephalus L.
(From Bull. 47, U. S. Nat. Mus.)

lantern in a boat, in the latter part of April, when this fish was running in great numbers, and having 361 leap into the boat during an hour and a half's row. I had hitherto regarded this as a somewhat

overdrawn "fish story," but, taking into consideration to-day's experience, and B.'s reputation for veracity, have concluded that it may be relied upon.

This mullet, *Mugil cephalus* L., is a fish of wide range, occurring in the Atlantic from Cape Cod to Brazil; also along the coasts of southern Europe and northern Africa, as well as in the Pacific from Monterey to Chili.

Like the common fresh water "suckers" of the north, it travels in schools, and seldom, if ever, bites the hook. It reaches the length of two feet, has a rather flat head and large eyes, abdominal ventral fins, and soft rays. The flesh of the mullet is soft and bony, and soon spoils; but it is much used for food on account of its great numbers and the ease with which it is taken.

Besides the mullet and the "sea trout," already mentioned, the drum-fish, *Pogonias cromis* L., is often caught from the bridge at Ormond, one specimen weighing forty-five pounds having been taken in February. It is rather a coarse fish, of no great value as food. The largest specimen on record was taken a few years ago at St. Augustine, and weighed 146 pounds. Sea-bass, *Sciænops ocellatus* L., weighing ten to sixty pounds, are frequently caught in the surf, as are also sharks of much larger size.

Near where we landed on the peninsula, a pretty woodland path has been cut out through the underbrush across that body of land to the sea. By pass-

ing along this path, for which in places the sand has been excavated for three or four feet, one notes that the surface of the peninsula is composed of alternate high sandy ridges and low swales. Its western half is evidently of much the older origin, since on it are large pines, oaks, hickories, etc.; while the eastern portion bears only a thick chaparral of saw palmetto, with here and there a clump of scrub oaks.

April 1, 1899.—All the morning clouds hid the sun, and nature wept copious tears. In other words, it rained—torrents at times—gently at intervals. A little after ten the heavens cleared and I went forth along the woodland lane in search of beetles.

On the leaves of an oak, I found a pair of small scarabs, *Diplotaxis languida* Lec., described from Tampa in 1878, and known only from Florida. It is light brown in color, and but one-quarter of an inch in length; the male, as commonly, more slender than the other sex. A leaf of another oak yielded a specimen of a handsome Chrysomelid, *Cryptocephalus bivius* Newm., one-fifth of an inch in length. Its thorax bears four lengthwise stripes each of black and yellow, while the elytra, or outer wings, are brick red, with three transverse rows of black spots. It is a rare species of our southern insect fauna. A closely allied species, *C. guttulata* Oliv., was also taken from a nearby shrub.

On my way to the shell mound, where I am now writing, I met an old friend, *Calosoma scrutator* Fab.,

walking rapidly over the fallen leaves in the palmetto groves. I said "Hello," and consigned him to my cyanide bottle, to remind me in future years that he is found mature on April Fool's Day in Florida. This large, bright colored beetle is not recorded in any of the published lists of Florida Coleoptera. It reaches a length of one and a fifth inches and is bright green, except the margins of the elytra, which are tinged with coppery red. It ranges over almost the entire United States, and is carnivorous in habit; being usually found running about in search of some caterpillar or other insect or worm which will furnish it a meal.

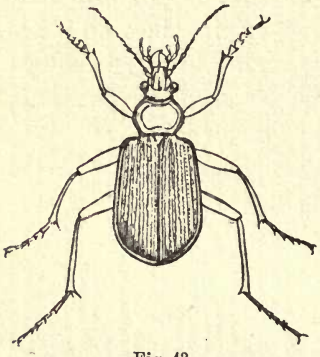


Fig. 43.
Calosoma scrutator Fab.

From the yellow flowers of a senecio I take a half-dozen specimens of a tri-colored hemipteron, *Melanocoryphus bicrucis* Say. It is a common southern "bug," seven-twentieths of an inch in length; the ground color red; the head, feet, front margin of thorax and tips of elytra, black. The inner edges of the elytra form a yellow cruciate line, whence the specific name *bicrucis*.

The large green dragonfly, *Anax junius* Drury, is very abundant to-day. I pick with the fingers from the leaves of the saw-palmetto a dozen or more.

A shower at this season, such as we had this morning, brings out the insects and other forms of life which inhabit a sandy region like this. An hour after its close life is everywhere. One can scarcely lift a chip from the ground, a piece of bark from a fallen tree, or gaze upon a leaf or flower without finding some form of worm, mollusk, insect, or higher form of life. As I write, a small black Lampyrid beetle, *Polemius* sp. ?, alights upon my hand and crawls to and fro across its surface. I put him in a bottle, and within a minute or two the life that was within him yields to the fumes of the deadly cyanide, and ceases forever. What is that life? Long has mortal man, the highest of all living things, studied and pondered o'er this question, yet it remains unanswered. If ever answered, it will be by the science of chemistry, which asserts that that which we call "life," be it in plant or be it in animal, is but the manifestation of the workings of that king of natural forces, chemism; that when the elements in the living laboratories, the cells of the organism, cease for an instant to combine, the nascent power which they possessed at the beginning of that instant is gone forever—affinity ends—what we call "death" ensues, and the elements go back once more to Mother Earth, to be used again by some succeeding organism. And yet, some of the forms

which possess this life are so minute that it seems a miracle how the organs necessary to perpetuate the chemical changes can exist within the bodies of the beings which possess them. Yet live they do, use oxygen, assimilate food, grow, reproduce their kind, and perform all other duties necessary to their existence, e'en though made up of but a single cell.

April 2, 1899.—The morning fair; the wind high; the temperature 60° at 7:30 o'clock. I betook myself to an orange grove two miles west of Ormond, in order to see, if possible, orange blossoms before I leave Florida. On the way I took from the flowers of a Senecio a number of specimens of a pretty tri-colored, slender-bodied beetle, *Languria marginipennis* Schwz. It is three-tenths of an inch in length; red, blue and black in color; the black being confined to the head, part of the legs and a spot on the thorax; and the blue to the elytra. It was described from Tampa and Enterprise in 1878, and is not known to occur north of this state.

At the orange grove I found but a single blossom. I got the scent of it, but left it as a reward to the owner for his labor and expense in saving the tree from the ravages of the frost. This is the only grove in an area of one hundred square miles which, escaping the rigors of the winter, bears green leaves and an occasional blossom. The owner, warned by the weather bureau twelve hours in advance, placed over each tree a tent, within which he kept burning a coal-

oil lamp. Water was sprayed over the outside of each tent and allowed to freeze. It cost $3.50 each to save the one hundred and twenty-five trees of the grove. Another season it will cost but little, as the tents and oil stoves will be on hand. Verily, in this part of Florida an orange grove is a costly plaything.

From the leaves of one of the trees in this grove I took two specimens of that large, dark brown heteropterous insect, *Metapodius femoratus* Fab. It is one of the largest of our native true bugs, the length being a little more than an inch. Its noteworthy characters are a small projecting spine between the antennæ; the enlargement of the hind tibiæ, by a dilated and compressed plate, and numerous small elevated dots or tubercles on the upper surface of the thorax. It is said to be a rather frequent insect in the Gulf states.

Fig. 44.
Metapodius femoratus Fab.
(Three-fourths natural size.)

On my way home I stopped for a time in a deserted orange grove, near the old Spanish chimneys. Here I examined carefully the structure of a "shack"—one of the common temporary shelters erected by the natives or occasionally by hunters and tourists. It consists of a framework of poles nailed to posts driven into the ground, or to convenient trees, and having

the roof and sides covered with several layers of palmetto leaves, which are in turn nailed to the poles, so that their blades overlap, thus furnishing a perfectly waterproof shelter. The roof is slanting. There is to this one a doorway, but no door and no window, though both of these could be readily inserted. A man can build one of these shacks in a substantial manner in less than two days. It will last several years, and with a door and window in place, and a stove within, he can keep comfortable during the coldest Florida winter.

'Tis a cheap and easily constructed shelter, sufficient in every way for a person in good health. With such a shack by the side of some stream or lake, with a gun, fishing tackle, collecting outfit and some good books to while away an occasional hour, methinks a naturalist could spend the winter in Florida, and live a free, enjoyable and inexpensive life.

April 3, 1899.—To the Bennett clearing, near the old chimneys, I go again, in search of some form of animal life unknown to me. Nor is my search in vain, for I find a locust new to my collection, *Paroxya atlantica* Scudd., a slender-bodied, wood brown species; known from the other members of the genus by the short antennæ of the male. It occurs only along the Atlantic coast of Georgia and Florida. The males are active leapers, jumping from tuft to tuft of grass and dodging around the stems. The females are much larger and more clumsy, and therefore seldom

leap to escape capture, but attempt to hide by burrowing deep down between the stems.

Chamæleons are more frequent in this clearing than elsewhere hereabouts. Three were taken from the leaves of a young palmetto, one of which was just moulting. This handsome lizard is distributed from the Rio Grande to North Carolina. It is also common in the Bahama Islands and Cuba, where it reaches a larger size than in the United States. Its principal food is insects, especially flies and spiders. The harder shelled beetles and locusts it does not seem to fancy. Mrs. L. M. Wallace, a lady living near Ormond, who is a close observer, tells me that she has seen the chamæleon, on several occasions, fish for "doodle-bugs" or the young of the ant-lion, *Myrmeleon rusticus* Hag., with its tail. As is well known, these insects construct for themselves a cone-shaped

Fig. 45—Pit-fall of an Ant Lion.
(After Comstock.)

pit in the sand or humus of an old log, at the bottom of which they hide, and wait for some unwary insect to tumble into the pit, when they quickly seize and devour it. Mrs. Wallace states that the chamæleon

approaches cautiously the pit, and, sticking in the end of its tail, wiggles it gently to and fro. The "doodle-bug," thinking it an insect, seizes the end of the tail in its large jaws and is immediately whisked out and swallowed by the ingenious saurian fisherman.

Since the chamæleon was just issuing in numbers from its winter abiding places about the time I left Florida, I was able to see but little of its daily life. As it is known to many northern people through specimens brought from the south as curiosities, or to be senselessly worn as ornaments by persons who wish to call attention to themselves, and know no better way than to wear a live lizard on their bosom or cravat; I incorporate the following extracts concerning its habits. Holbrook, that charming writer on the characters and habits of our reptiles, says of it: "The green lizard, *Anolis carolinensis* Cuv., is a bold and daring animal, haunting outhouses and garden fences; and in new settlements it even enters the houses, walking over the tables and other articles of furniture in search of flies. It is very active, climbing trees with great rapidity, and leaping with ease from branch to branch or from tree to tree, securing itself even on the leaves, by means of the oval disks of the fingers and toes, which enable it also to walk easily on glass, and on the sides and ceilings of rooms. It feeds on insects, and destroys great numbers, seizing them suddenly, and devouring them, unrestrained even by the presence of man. In general they hiber-

nate later than other animals of the same class, their favorite retreats being gardens and old buildings; they often retire to greenhouses or conservatories, where they may be frequently seen active, even in winter, but never of that rich yellow-green as in the summer season. In the spring season they are extremely quarrelsome; two males seldom meet without a furious battle, which frequently results in the loss of part of the tail, or some other injury, to one or both of the combatants. Before the contest, the animal usually remains stationary for a moment, elevates and depresses his head several times, inflates his gular sac, which now becomes of a bright vermilion, and then suddenly springs at his enemy. After the first heats of spring have passed, they become less quarrelsome, and many are seen quietly living together in the same neighborhood; they retain at all times the habit of inflating the sac, even when quietly basking in the sun, and at those times the coloring of the animal has the liquid brilliancy of the emerald."*

Dr. R. W. Shufeldt has also given a most entertaining account of the habits of this handsome lizard, the closing paragraph of which I quote: "The season approaches when Florida, recovering from the temporary shock caused by her mock winter, again puts forth the natural jewels of her animal and vegetable kingdoms, again presents us with fresh flowers and

*N. Am. Herp., I, 1836, p. 69.

fresh fields, after so short a relapse. Birds once more stream northward, mammals throw off their semi-torpidity and resume their usual avocations. In the overflown bayous, rendered almost unendurable by an atmosphere charged with all the aromatic odors of a budding southern spring, we at this time, too, see the gaudy representatives of the reptilian world gradually make their several appearances. Frogs croak, Hylas peep, and in some sunny nook the deadly moccasin warms his snuff-brown coils, alone, dreaded and shunned. All rejoice that this happy

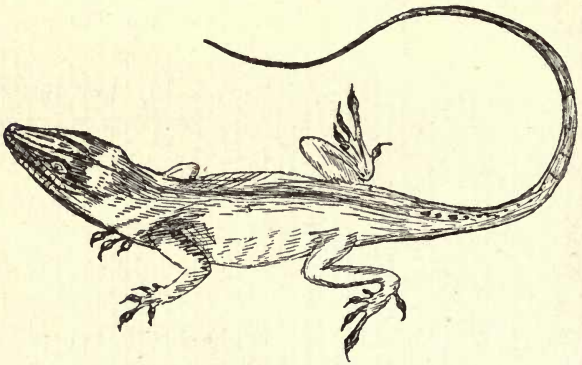


Fig. 46—Chamæleon.

season once more opens, and the feeble grasp of the winter god is withdrawn. Where is Anolis now? We have not far to go, indeed, to find our bi-colored masquerader; see the emerald-clad scamp as he eyes you from the brawny limb of the pecan, under which

you stand. But what is he up to? You quietly watch him, and his employment seems to be of such a nature that he soon completely ignores you, and proceeds with it at all risks, and at all costs. The mystery is soon solved, and we can readily appreciate this agitation, this bowing and strutting, and all manner of quaint motions, as if the very last drop of his quaint lacertilian blood was on fire—for coyishly, and in all due deference, reclines before his lordship, his chosen mate, exerting all her chamæleonic powers to hide her blushes by vain endeavors to match the colored pattern of her couch, with all the bronzes and browns at her command. He can withstand her charms no longer, and for the moment, laying aside all dignity, and the object of his affections not unwillingly submitting, in the next instant finds herself in the passionate embraces of her lord, who, to make sure that he has actually won his coveted prize, winds about her lithe form, perhaps in some mystic love-knot, his entire caudal extremity, and blinds her eyes, first on one side and then on the other, by the extension of the flaming ornament at his throat."*

The owner of the clearing, who is plowing potatoes as I catch bugs and lizards, informs me that an alligator, four feet in length, was killed by the train on yesterday. It had crawled upon the trestle across Thompson's Creek, a half mile northwest from Or-

*American Naturalist, XVII, 1883, p. 925.

mond, to bask in the sun, and failed to get off in time to avoid the locomotive.

He also states that a friend of his who is a hunter in the Everglades of South Florida, made $110 in one day in 1897 by shooting egrets on their nests in order to secure the skins and plumes for millinery purposes. It was a wanton slaughter of innocent birds to satisfy the vanity of woman. Two species of egrets, or white herons, were, ten years ago, very common during the migratory seasons in Indiana. Now, but one or two are noted each season. The murderous work done for hire by these southern pot-hunters is alone responsible for their scarcity; yet back of it all is the demand of fashion, the vanity of the fairer sex of that higher animal—man.

April 4, 1899.—This morning the sun is hidden behind a veil of clouds, which occasionally yield up a few drops of their component moisture. The temperature is mild—about 60°. I make my way out past Soudan, that portion of Ormond devoted to "Darkest Africa," to the hammocks beyond. Just above the darkey cabins I step upon a snake and involuntarily jump back. It is a long, slender, black reptile, which, after crawling slowly a few paces, stops and gazes up at me. As I approach cautiously, it starts off more rapidly and I bring one foot down upon its body; a little too far back, however, to prevent its striking savagely at my insect net which I thrust between it and my knee. I soon get a firm hold on it just back

of the head and hold it up as it squirms and writhes, for a closer view. It is evidently a slender form of the common, harmless black snake, *Bascanion constrictor* L. I wish to compare it more critically with northern forms, and so place it in the only receptacle which I have at hand, a tin box, which it fills to the brim. Reptiles, especially snakes, have been so scarce heretofore that I have quit carrying the strong muslin bag in which I usually place such forms. Thinking it may, by writhing, force open the lid of the box, I search my pockets for a string, but that, too, is lacking, so I retrace my steps to the nearest cabin in quest of one. Three negro men are in the yard. One, old, fleshy and voluble of speech, immediately I make my desire known, begins to talk of snakes. He affirms that the one with red and black rings, a species of *Elaps* which I have been told is frequent about here, has a stinger in the end of its tail which it uses as a defensive organ. I do not openly deny his statement, but he is certainly mistaken. He and his companions seem to know but four or five species of snakes, viz., the *Elaps* mentioned, the striped garter snake, the black snake which I show them, the spreading viper or "spotted addah" and the rattlesnake. According to their belief the bite of all of these is "sho' nuff death," except that of the black and garter snakes. In reality, the bite of but one, the diamond rattlesnake, is known to be venomous, though that of the *Elaps* is so reputed. I finally

obtain a piece of cotton string to tie my box and then resume my outing.

A pack of pickaninnies followed after me and watched me searching for insects. I showed them the snake and told them I would pay them for such snakes as I do not have. The youngest of them glanced askance at me and asked: "Mistah, what duz you-all want 'em foh?" "To make soup," I replied. He turned to his older companions in open-eyed amazement. He was speechless even. Snake soup was to him an unthought-of, unheard-of delicacy. He may to-night dream of a pot of hissing serpents, raising their heads at intervals above the top, glaring at him and darting forth their tongues, while their bodies and tails writhe and sizzle in the water beneath.

A happy-go-lucky race, these Florida negroes; content with shelter crude, with corn pone and sirup, with a few clothes to cover their nakedness. Their children are legion, the ties of marriage being but loosely observed. For the most part illiterate, one day, to them, is as another. "Sufficient unto the day is the evil thereof," would doubtless be their motto did they know its meaning. Free from ambition, knowing little of the great world beyond and caring less, they shuffle through life content with their lot; dwelling here 'neath the sunny skies and balmy airs in a land which seemingly was formed for such as they.

By the side of the railway I find a second specimen of the thistle, *Carduus horridulus* Pursh. It belies its name, for it is a most handsome plant. Its stem has, in the past, been cut off about two feet above the ground. From just below the cut a dozen or more flower stalks have grown upward for eighteen inches in umbel-like fashion. Each of these stalks bears a single large flower or bud. The flowers are two inches or more across when fully expanded. Each is sub-tended by a double circle of long, slender bracts, which curve upward and form an urn-like involucre in which the blossom rests. These bracts bear a double row of purple spines along their margins and each is tipped with a similarly colored long and slender spine. The uppermost leaves are opposite, bract-like, and also armed on the margins with handsome purple spines. The flower itself is a charming rose purple in hue. 'Tis handsome enough to grace a queen's table, yet it blooms here in the gutter by the railway, unnoticed and unknown. Why should not such a plant be tended in a hothouse, given a high sounding name, and sold for a fabulous sum? Were it not for its prickly armor such might be its fortune.

On one of its blossoms I find a single specimen of a pretty Chrysomelid beetle, *Lema ephippiata* Lac., one-third of an inch in length, red except the elytra, which are steel blue; and the antennæ and tibiæ, which are dark brown. The blossoms also bear two specimens of a grayish-brown hemipteron, *Margus*

inornatus Stal, which has not before been recorded north of Mexico.

April 5, 1899.—Once more, and for the last time this season, if not forever, I sit on the Tomoka's bank. Its waters are still as dark, as deep, as slow flowing as ever. Their surface is not, however, so placid as when I saw it last, but is broken by great waves, engendered by the strong northeast wind, which, for sixteen hours, has been blowing, raging, seething. A great vacuum has been formed somewhere to the southwest. Toward it the air from the northeast has rushed with a mighty roar, a part of the time at the rate of sixty miles an hour. All night the pines bent before its blast. All night they creaked and groaned. The dwelling in which I essayed to sleep at times rocked like a cradle. Windows rattled incessantly; shutters blew to and fro, yet the morning broke with the sun smiling as ever at the work he had wrought—for his unequal heating had caused the vacuum. I have seen but few forms of animal life on my way hither this morning. They have taken shelter, as I do now, from the fury of the blasts.

A great pileated woodpecker hopped backward a foot or two down a dead pine, paused and listened, then repeated the process until he reached the ground. Upward he starts on the opposite side of the tree. Peering around the side he espies me, and long and earnestly he gazes. Finally flapping his wings, he is away to another snag a hundred yards distant. O,

king of birds hereabouts, thou needst have no fear on my account! I am not thine enemy, only thy rival. Beneath the bark and rotten wood of trees I, too, seek insects. Thou lookest principally after the larval forms, I after the mature. Thou seekest them for sustenance, I for pastime. If thou wert only willing, together we might work, in peace and harmony, on the same snag at the same time. I could watch the movements of thy powerful bill as it sank deep into the decaying wood, and could in turn pull off with my implement of search, my good right arm, great pieces of the loose bark and unfold to thy gaze many a white ant, many a fat grub. But thou willest otherwise and lookest upon me as an enemy. Far be it from my mind to do thee harm. I only wish thee success in finding many a grub for thy morning's meal, even if by so doing thou shalt lessen the number of mature beetles which will, perchance, fall to my share in future days.

I note where an oak has thrust its tap root through a layer of the coquina rock, three feet in thickness. The root, now decayed, is eight inches in diameter. Perchance a worm hole first gave lodgement to the tiny rootlet of the sprouting acorn.

The first mature males of the slender-bodied, grayish-brown locust, *Rhadinotatum brevipenne* Thos., were seen on March 22nd. To-day the mature females are abundant. It is the most curious Orthopteran found here at this season. The body is very slender

and compressed; that of the males one and a quarter inches in length; of the females nearly two inches. The head is long and projects upward in the form of a pyramid, the face being extremely sloping. The antennæ are flat and broad at base and taper towards the apex. The tegmina, or outer wings, are very short and narrow, their maximum length being but about one-fifth of an inch. This locust has been recorded only from one or two points in Florida. Here it is common on the clumps of wire grass, in sandy places along the edges of woodland paths and old fields. Its short wings prevent it from flying, and as it is but a poor leaper, it is readily taken with the fingers. It relies upon protective mimicry as its chief mode of defense; hence its organs of locomotion, wings and legs, have developed but little, the former being mere pads, the latter very slender and used mainly for walking and for clasping the stems of grass. The brown, linear body, when extended lengthwise along a dead grass stem is scarcely noticeable, so closely does its hue correspond to that of the grass. The insect remains motionless until about to be seized, when it sometimes gives a short leap to one side.

The number of colonies of the young of the lubber grasshopper, *Dictyophorus reticulatus* Thunb., has greatly increased during the past week, and some of the earlier ones hatched are past the third moult. Usually fifty to seventy-five of the young are on a

single weed or bunch of grass, whose leaves they wholly devour. They are a greenish black in color with a narrow stripe along the back of orange or blood red. The sides of head and hind edge of thorax are also of the brighter color. One colony, noted near the Tomoka cabin, was an uniform reddish brown instead of black and red. It may have been composed of the young of an allied species, *D. marci* Serv. The young of the lubber locust are wholly

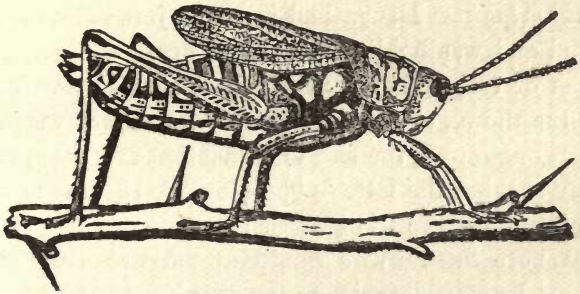


Fig. 47—Lubber Grasshopper.
Dictyophorus reticulatus Thunb.
(Mature female.)

wingless and very clumsy, crawling feebly over the ground when knocked off the plant to which they are clinging. They are said to have no known natural enemies, being so nauseating that even chickens reject them as food. They occur throughout the Gulf States and as far north as Chattanooga, Tennessee, and occasionally do much damage by feeding upon the leaves of vegetables and orange trees.

When mature they reach a length of nearly three inches and are correspondingly robust. They are then of a yellow or orange color, barred and spotted with black. The outer wings cover little more than half the abdomen and are quite showy, being yellowish spotted with black above, while the sides are rose pink. They become full grown in May.

On the way home I observed a dragonfly, *Pachydiplax longipennis* Burm., fluttering on the ground. Investigation showed that a robber fly, *Proctacanthus philadelphicus* Macq., had seized it just back of the head and was holding on with a death-like grip, its beak or tongue being deeply imbedded in the front of the thorax of the dragonfly. The captor was less than one-fourth the size of its victim, and was probably sucking the latter's blood on the spot, as it was plainly too large to be carried away.

Where the railway runs between two marshes I found between its rails on my way homeward several dead specimens of Bauer's box turtle, *Kinosternon baurii* Garm. They had evidently attempted to cross the railway from one marsh to another and had gotten between the rails, but could not get over them. They did not appear to have been injured by the trains, and had probably died from lack of water.

This is the most northern point from which this turtle has been recorded. It differs from *K. pennsylvanicum* Gmelin, also found here and ranging north to northwestern Indiana, by the greater develop-

ment of the plates of the plastron, and by the presence of two yellow lines on each side of the head and three pale, lengthwise bands on the carapace. It can close its shell more completely than can its close ally, the better known mud turtle. A live specimen of *K. baurii*, taken later, measured four inches in length by nearly three in breadth.

April 6, 1899.—To-day I make my last trip along the sea beach. Old ocean is on a rampage after the wind storm of yesterday. The surging waves strike the sands far out, then tumble and toss in a mad race for the shore. No human agency can bar their action —their onward coming. It is a power beyond control of man which brings them on. It is hard to realize that three-fourths of the surface of the earth is covered with this surging, rolling, ever-moving mass of waters. Great monsters are begotten, are born, live, move and die within their midst, possibly without ever catching a sight of land. They are the home of myriads of forms of life, untold myriads of individuals. Thousands of humans each year find a final resting place within their depths.

As the waves strike the edge of the shore they lose their turbulency, roll for a distance on the sands, then die content. 'Tis like the mad race of men for some goal where they expect to find honor, wealth and happiness. They toil, they struggle, they surge, they beat over and around one another. Some of them finally reach what they are striving after and often-

times find it worthless—lacking honor, and especially lacking happiness. "We are never happy; we only know that we were so once."

As I come out of the narrow path, which leads through the mazes of saw palmetto at the point where I crossed the peninsula, and get my first glimpse of the ocean, I see an osprey dive down, struggle in the water an instant, then rise triumphantly upward with a large fish in his talons. Far inland he flies, bearing his prey to his mate on her nest, or perhaps to some eyrie on tall dead tree where he can devour it in solitude unmolested by eagle or other enemy.

Over the mainland I note the "Bird of Freedom," a magnificent bald eagle, slowly soaring. The sunlight glints from his white head and tail. He has evidently been on the watch for the fish hawk, but has missed him. A robber baron he, who gets his living mainly by preying upon his weaker brethren, seldom by honest bird labor.

Fig. 48—*Pasimachus subsulcatus* Say.

The pathway has, in places, been cut through the sand ridges of the peninsula and a board walk put down. Beneath one of the loose boards of this walk I find a small whip scorpion or vinegerone, its jointed telson turned up over its back. Two feet from it are four specimens of a medium sized carabid beetle, *Pasimachus subsulcatus* Say. It is shining black and four-fifths of an inch in

length. These beetles and the whip scorpion are the only rewards of a half hour's search along this pathway, the sand yielding little nourishment to attract living forms.

In the garden and orchard adjoining an old dwelling on the river side of the peninsula butterflies are plentiful. Among them are two old friends whom

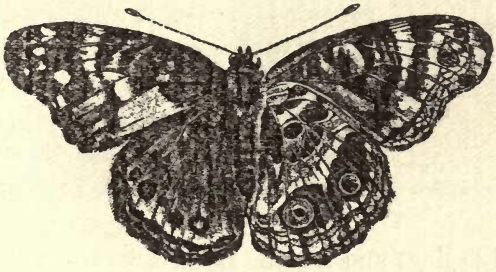


Fig. 49—The Painted Beauty.
(After Harris.)
(The under side of wing is shown on the right.)

I first met fifteen years ago in Indiana, viz., the painted beauty, *Pyrameis huntera* Fab., which ranges from Nova Scotia to Mexico; and the silver-spotted skipper, *Eudamus tityrus* Fab., also a form of extended range. The latter are flitting in numbers about the showy purple blossoms of the large flowering verbena, *V. aubletia*. Here also I take a single specimen of *Pamphila maculata* Edw., a dark brown skipper, with wing expanse of one and a half inches, whose range is confined to the Gulf states. Several

examples of the "little metal mark," *Calephelis cœnius* L., the smallest butterfly I have seen in Florida, are noted in this garden, though but one is captured. It expands but three-quarters of an inch. The upper surface of the wings is of a rust red hue, crossed by four or five narrow, wavy black lines. The under side is yellow fulvous, with numerous dark metallic lines and spots. It, also, is confined to the southern states, and frequents the wild flowers which are in blossom from April to July.

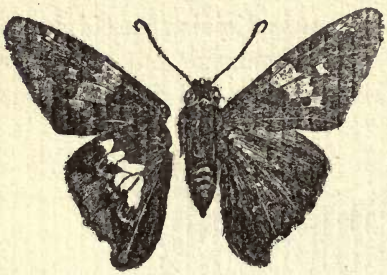


Fig. 50—The Silver Spot.
Eudamus tityrus Fab.
(The under side of wing is shown on the left.)

The little peeper or cricket frog, *Acris gryllus* LeConte, is an abundant resident along the borders of the Halifax and in the weedy and marshy inlets which are connected with it. The skin is smoother and the bars on the hind femora are more distinct than in the northern form, *A. crepitans* of Baird. The habits of *A. gryllus* are the same as those of *A. crep-*

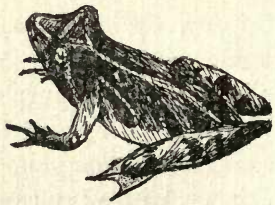


Fig. 51—Southern Cricket Frog.
Acris gryllus LeC.

itans in the north, which have been described by Dr. O. P. Hay as follows:

"The cricket frog is not thoroughly aquatic, but delights to spend its time amid the vegetation about the border of the water. When frightened it will leap into the water, but it often appears to become alarmed at its rashness and hastens to reach the land again. When followed up, however, it will go to the bottom and seek to conceal itself for a while. Though belonging to the 'tree frogs,' it never ascends trees, and probably climbs only the shorter grasses and water plants. It is a cheerful little creature, and on warm days may constantly be heard executing its noisy song. This resembles closely the striking together rapidly of two pebbles, and often, when their singing has been interrupted by the passer-by, it may be started again by clicking two stones sharply together."*

Holbrook has written of the southern form, *A. gryllus:* "This is a merry little frog, constantly chirping like a cricket, even in confinement; it frequents the borders of stagnant pools, and is often found on the leaves of aquatic plants, and rarely on the branches of such low shrubs as overhang or dip in the water. It feeds on various kinds of insects, and makes immense leaps to secure its prey, or to escape its pursuers. It can easily be domesticated, and takes its food readily from the hand; I have kept

* Batrachians and Reptiles of Indiana, 1891, p. 462.

several for months in a glass globe on a few sprigs of purslain, *Portulaca oleracea* L. Their chirp, at times, was incessant, and sprinkling them with water never failed to render them more lively and noisy."*

April 7, 1899.—This morning, 'neath cloudy, threatening skies, I made my way to the clearing near the old chimneys. No sooner had I arrived there than the threatened deluge began. It was a veritable Florida downpour, which lasted three hours. I took shelter in the shack of palmetto leaves which I have before mentioned and found it perfectly water-proof. The two natives who had been working in the clearing were sheltered with me and we talked of many of the animals and birds which inhabit this region.

They affirmed that the ivory-billed woodpecker, *Campephilus principalis* L., is still rather common in the heavy timbered hammocks, several miles back from the railway; also that the Carolina paroquet, *Conurus carolinensis* L., was common about Ormond until 1887, and that it is still abundant in the everglades and the more primitive portions of southern Florida. Both these birds were once common in Indiana, but long since disappeared from that State, retreating before the advancing civilization of the white man to the deepest recesses of these southern forests.

The black or brown bear, *Ursus americanus* Pallas, is still occasionally seen. Seven or eight were

* North American Herpetology, III, 1838, 76.

killed within a half dozen miles of Ormond during the past winter. I myself have seen the tracks of one crossing the roadway, and have noted where another has clawed open the nest of a ground bee in search of honey. Bennett, one of the natives, says that the bears kill the hogs in the winter time, when other food is scarce, and drive them out of the hammocks.

The Virginia deer, *Cariacus virginianus* Bodd., are frequent, and many are killed in season. Wild turkeys are becoming scarce near the settlements and good ones bring $1.00 to $1.25 in the market. Both otter and mink are rather common along Thompson's creek and the Tomoka. Raccoons are also plentiful. However, the skins of these animals bring much less than in the northern states, where the fur on them is far better in quality.

The taking of alligator skins at one time furnished quite a revenue to the natives of this portion of Florida. Their numbers have diminished greatly in recent years, and the former "gator hunter" now has to look to other sources for most of his income. The greater number of those now killed are taken in summer in the swamps and wet hammocks after the water has receded. Only the skin of the lower or under portion of the body is saved. This is salted, rolled up and put into a barrel. As soon as the barrel is full it is taken to some railway station or steamer landing for shipment. The skins bring, on an average, but about $1.00 each.

The eggs of the alligator are laid in large conical nests composed of mud, twigs and leaves. They hatch in May or June, and the young, when a year old, are about a foot in length. Bartram, who spent many months in this state at a time when these saurians were present by thousands, and before their habits had become changed by the presence of a horde of sportsmen intent upon their destruction, wrote of them as follows: "On turning a point or projection of the river bank, at once I beheld a great number of hillocks or small pyramids, resembling hay-cocks, ranged like an encampment along the banks. They stood fifteen or twenty yards distant from the water, on a high marsh, about four feet perpendicular above the water. I knew them to be the nests of the alligator, having had a description of them before; and now expected a furious and general attack, as I saw several large alligators swimming abreast of these buildings. These nests being so great a curiosity to me, I was determined at all events immediately to land and examine them. Accordingly, I ran my bark on shore at one of their landing places, which was a sort of nick or little dock, from which ascended a sloping path or road up to the edge of the meadow, where their nests were; most of them were deserted, and the great thick, whitish egg-shells lay broken and scattered upon the ground round about them.

"The nests or hillocks are of the form of an obtuse cone, four feet high and four or five feet in diameter

at their bases; they are constructed with mud, grass and herbage. At first they lay a floor of this kind of tempered mortar on the ground, upon which they deposit a layer of eggs, and upon this a stratum of mortar, seven or eight inches in thickness, and then another layer of eggs, and in this manner one stratum upon another, nearly to the top. I believe they commonly lay from one to two hundred eggs in a nest; these are hatched, I suppose, by the heat of the sun; and perhaps the vegetable substances mixed with the earth, being acted upon by the sun, may cause a small degree of fermentation, and so increase the heat in those hillocks. The ground for several acres about these nests showed evident marks of a continual resort of alligators; the grass was everywhere beaten down, hardly a blade or straw was left standing; whereas all about, at a distance, it was five or six feet high, and as thick as it could grow together.

"The female, as I imagine, carefully watches her own nest of eggs until they are all hatched, or perhaps while she is attending to her own brood she takes under her care and protection as many as she can get at one time, either from her own particular nest or others; but certain it is, that the young are not left to shift for themselves, for I have had frequent opportunities of seeing the female alligator leading about the shores her train of young ones, just as a hen does her brood of chickens; and she is equally assiduous and courageous in defending the young,

which are under her care, and providing for their subsistence, and when she is basking upon the warm banks with her brood around her you may hear the young ones continually whining and barking, like young puppies. I believe but few of a brood live to the years of full growth and magnitude, as the old feed on the young as long as they can make prey of them.

"The alligator when full grown is a very large and terrible creature and of prodigious strength, activity and swiftness in the water. I have seen them twenty feet in length, and some are supposed to be twenty-two or twenty-three feet. Their body is as large as that of a horse; their shape exactly resembles that of a lizard, except their tail, which is flat or cuneiform, being compressed on each side and gradually diminishing from the abdomen to the extremity, which, with the whole body, is covered with horny plates or squammæ, impenetrable when on the body of the live animal, even to a rifle-ball, except about their head and just behind their forelegs or arms, where it is said they are only vulnerable. The head of a full-grown one is about three feet, and the mouth opens nearly the same length; their eyes are small in proportion and seem sunk deep in the head, by means of the prominency of the brows; the nostrils are large, inflated and prominent on the top, so that the head in the water resembles, at a distance, a great chunk of wood floating about. Only the upper jaw moves,

which they raise almost perpendicular, so as to form a right angle with the lower one. In the fore part of the upper jaw, on each side, just under the nostrils, are two very large, thick, strong teeth or tusks, not very sharp, but rather the shape of a cone; these are as white as the finest polished ivory, and are not covered by any skin or lips, and always in sight, which gives the creature a frightful appearance. In the lower jaw are holes opposite to these teeth, to receive them. When they clap their jaws together it causes a surprising noise, like that which is made by forcing a heavy plank with violence upon the ground, and may be heard at a great distance.

"But what is more surprising to a stranger is the incredible loud and terrifying roar which they are capable of making, especially in the spring season, their breeding time. It most resembles very heavy distant thunder, not only shaking the air and waters, but causing the earth to tremble; and when hundreds and thousands are roaring at the same time, you can scarcely be persuaded but that the whole globe is violently and dangerously agitated."*

The hogs belonging to the natives of this portion of Florida are marked and then allowed to run wild. They feed on pine nuts and other mast; on roots and on many forms of animal life, as water-dogs, mud eels, mollusks, etc., found about the wet hammocks. All cultivated land is, therefore, of necessity, fenced.

* Travels in N. America, 1793, pp. 124 et. seq.

Whenever "pork hungry," as Bennett put it, the hogs are rounded up with dogs and killed.

April 8, 1899.—This morn I hired a darkey and spent the day excavating in the shell mound, taking measurements, etc. This mound is but one of many which are scattered here and there over the entire Floridian peninsula. For the most part they are along the borders of the larger inland streams and lakes, though a number, like the one at Ormond, are located near the sea. I had no opportunity of exploring any of the inland mounds, though I heard of a number on my trip up the St. John's River. Prof. Jeffries Wyman wrote a most interesting account of these freshwater shell mounds, which was published in 1875.* In it he states that:

"The shell deposits on the river are entirely different as to their characteristics from the mounds of the sea coast. The last extend around the shores of the whole peninsula of Florida and in certain places as at Turtle Mound, Charlotte Harbor and Cedar Keys, are of gigantic proportions. They are composed exclusively of marine species, mostly of oysters on the Atlantic, but on the Gulf coast of several species belonging to different genera, as *Ostrea, Busycon, Strombus, Fasciolaria, Cardium*, etc."†

The above statement does not hold good of this mound at Ormond, which is on a brackish or tide-water river, within one mile of the Atlantic coast.

* Fourth Memoir, Peabody Academy of Science.
† Loc. cit., p. 9.

A Portion of the Ormond Shell Mound.

Showing a part of the excavation made in securing material for the sidewalks of Ormond.

Here there is a mixture of marine and fresh water shells, with the former, however, largely predominating. Oyster shells form but a minute proportion of the bulk of the mound; fully 90 per cent. of the shells present being those of the small marine bivalve, *Donax variabilis* Say.

The mound at Ormond is about one mile north of the center of the village. It is in the form of a long, low ridge extending north and south parallel to the west bank of the Halifax River. Though its sides are sloping, its limits are sharply defined, as one can readily ascertain by digging, as well as by the character of the vegetation, the latter changing where the shells wholly cease and the level plain of sand begins. The total length of the mound is 1,136 feet, or more than one-fifth of a mile. One-third of the distance from the north end it is 213 feet in width, and its eastern side reaches to within 50 feet of the edge of the water in the river. At its middle the width is 144 feet, and its eastern edge is 120 feet distant from the water. One-third the distance from the south end the width is 362 feet, and the eastern slope extends to within 20 feet of the water. This southern third embraces the main portion of the mound, as it is here much thicker than elsewhere.

About 50 feet from the south end an excavation has been made, 128 feet long and 64 feet wide, from which the shells have been hauled for fifteen or more years for use in making sidewalks and bicycle paths in

and about Ormond. One or more darkies have been carting away the shells almost every day that I have visited the mound. Their excavations, added to what I have done myself, have furnished a good opportunity for studying the materials of which it is composed. At the deepest point of excavation the layers of coquina shells (the *Donax* mentioned) alternate with layers of mold or a mixture of decaying vegetation and sand; there being six layers of shells varying from five inches to three feet in thickness, and five of mold from two to twelve inches in thickness. Intermingled with all the layers of shells are pieces of broken pottery, fragments of bones of mammals, turtles and fish; pieces of charcoal, ashes, etc. The larger shells, as those of the oyster and round clam, occur only in the two uppermost shell layers. The other shells are scattered irregularly through the mass of *Donax*. In a number of places many cubic yards of the *Donax* were exposed, as clean and unbroken as though they had been dumped but yesterday.

The greatest thickness of the mound, about 125 feet from the south end, was found to be nine feet, eight inches. A section at this point showed the presence of the following layers:

		Inches.
1.	Soil, rich and black	12
2.	Shells, more or less mixed with soil	25
3.	Shells, very clean	36
4.	Mold	3
5.	Shells	5
6.	Sand, pure and clean	2
7.	Shells	5
8.	Mold	4
9.	Shells	6
10.	Mold	4
11.	Shells	14
12.	Sand, surface of surrounding plain	..
	Total	116

In places a layer of charcoal, two and a half inches in thickness, occurs between Nos. 2 and 3 of the above section. The alternating layers of sand or mold between the layers of shells indicate that the people who formed the mound made periodical visits to this locality, their absence being sufficiently prolonged to allow the decaying vegetation to form the layers of mold or soil. It is possible, of course, that their rubbish was dumped on one portion of the mound while another portion formerly used was allowed to accumulate a layer of mold above the shells before being again used as a dumping place. Judging from the length of time even here necessary to form a continuous layer of soil or mold an inch in thickness, the mound must have been a long period, possibly several centuries, in the course of formation.

The soil at present overlying the whole mound is a rich, black, vegetable loam, ranging from eight inches to one foot in thickness. That outside the limits of the mound is thin, being but an inch or two in thickness above the prevailing whitish sand of the vicinity. The greater part of the surface of the mound was probably cleared and cultivated by the Spaniards in the early part of the eighteenth century. The remains of the mortar and coquina rock of their houses are found in two or three places on the highest points of the mound. Cabbage palmettos fifty to sixty feet high, and great pines two and a half feet in diameter and eighty to one hundred feet in height, at present cover its crest and slopes. Live oaks of large size are also scattered here and there among the pines and palmettos. One of these, a great spreading giant of its kind, growing on the eastern slope near the middle of the mound, is 115 inches in circumference, two feet above the ground. The size of this tree and the thickness of the soil on the crest are excellent witnesses as to the many years which have elapsed since the last bowl of Donax soup was brewed and the shells dumped on this kitchen-midden by an ancient people.

Representatives of twenty-eight species of mollusks were found in the mound.* Of these nineteen are of marine origin; eight occur only in fresh water, while

*This includes six species taken by Prof. C. H. Hitchcock in a subsequent investigation.

one is a land shell. As already noted, fully ninety per cent. of the shells are of the little triangular marine bivalve, *Donax variabilis* Say. This is at present a very common shell along the Atlantic coast from Cape Hatteras to St. Thomas. At low tide it may be gathered by the bushel from the sand along the beach opposite Ormond. It is still much used in making soup, and probably furnished most of the animal food of the people who formed the mound.

Fig. 52 *Donax variabilis* Say.

The following is a list of the shells taken from the mound:*

UNIVALVES.

1. *Murex fulvescens* Sowerby. One specimen from near the bottom of the mound. Fragments of others were seen. It is a post-pliocene species which is yet somewhat rarely found along the coasts of Florida and the West Indies.
2. *Fasciolaria gigantea* Kiener. Among a collection of shells taken from the mound by Professor Hitchcock and sent to me was a single specimen of this large univalve. It occurs quite commonly along the Florida coast.

* For aid in preparing this list I am indebted to Mr. Charles T. Simpson, of the U. S. National Museum, and to Mr. L. E. Daniels, of Laporte, Ind.

3. *Fasciolaria distans* Lam. Scarce. Occurs in the upper half of the mound. Ranges from Cape Hatteras to Yucatan.
4. *Fulgur carica* L. Common in the upper half of the mound. It is at present an abundant species in shallow water from Cape Cod to St. Thomas.
5. *Fulgur perversus* L. Professor Hitchcock secured several specimens of this left-handed form. It is a post-pliocene species ranging from Cape Hatteras to Cuba.
6. *Fulgur canaliculata* Dillwyn. This species was represented by several young examples taken by Professor Hitchcock. It occurs from Cape Cod to the Gulf of Mexico.
7. *Oliva literata* Lam. But one specimen was found. It was near the middle of the mound. Its present range is from Hatteras to Key West.
8. *Polinices duplicata* Say. This marine snail is, next to the *Donax,* the most common shell in the mound; especially in the upper half. At present it is abundant along the beach opposite Ormond.
9. *Crepidula fornicata* Linn. But two specimens of this "boat-shell" were found. They were in the uppermost layer of shells. It occurs along the full length of the Atlantic coast.

10. *Vivipara georgiana* Lea. A few specimens of this southern fresh-water univalve were scattered through the upper half of the mound.

11. *Ampullaria depressa* Say. This is another fresh-water shell, which is abundant in the St. John's River and its tributaries. According to Wymans, it forms a large proportion of the fresh-water shell mounds along that stream. In fact, he states that it, *Paludina multilineata* Say and *Unio buckleyi* Lea, are the three species which form these mounds. He then adds: "Either of these species, instead of being promiscuously mingled with the rest, as is generally the case, may be found forming considerable deposits by themselves, without the admixture of the others, as if at certain times they had been exclusively used for food."

This is true of the Ampullarias in the mound at Ormond. They were found in but three different places, about a peck in each place, and nowhere else. We can suppose, therefore, that some visitor, or member of the party here encamped, returning from an inland stream brought an occasional supply of these fresh-water mollusks with him as a variation of diet for his dusky brethren. After serving up the animals as food, the empty shells were dumped into one place on the re-

fuse heap near their dwelling, there to remain for centuries, and when uncovered to serve as a source of speculation for some visiting naturalist.

12. *Glandina truncata* Gmel. A few specimens of the shells of this common land snail were found scattered here and there among the shell layers of the mound. It is possible that they found their own way there during the time of its formation.

13. *Planorbis glabratus* Say. Several examples of this fresh-water mollusk were secured by Professor Hitchcock. It is quite common in the ponds about Ormond, and ranges throughout the southeastern United States.

BIVALVES.

14. *Tagelus gibbus* Speng. A single valve of this representative of the razor-clam group was found in the lower third of the mound. It ranges from Cape Cod to Trinidad.

15. *Donax variabilis* Say. This "coquina clam" forms by far the greater part of the mound.

16. *Venus mercenaria* Linn. Two or three deposits, comprising a half bushel or so each, of the shells of this round clam were found in the uppermost third.

17. *Cardium magnum* Born. A few valves, mostly broken, were found in several of the shell lay-

ers of the mound. It is a Pliocene species which yet occurs along the coast from Virginia southward.

18. *Unio obesus blandingianus* Lea. A number of the valves of this fresh-water form were scattered throughout the mound. The epidermis had wholly disappeared. It occurs in streams throughout Florida, and northward to southern Virginia.
19. *Unio occultus* Lea. A few valves of this Unio were taken mingled with those of the last named species. It is known only from Florida streams.
20. *Unio coruscus* Gld. Several valves of this Unio were secured by Professor Hitchcock. It is known only from the streams of Florida.
21. *Unio sp.?* One valve of a Unio, distinct from any of the above, was found by Mr. Simpson among the specimens submitted to him.
22. *Anodonta imbecillis* Say. A number of worn and partly decayed shells of this handsome fresh-water form were present. According to a note by Mr. Simpson, it is not at present known to occur south of North Carolina.
23. *Arca americana* Gray.
24. *Arca ponderosa* Say. Numerous valves of these two marine bivalves were found in all the layers of *Donax* shells. They are now common along the beach opposite the mound.

25. *Modiola plicatula* Lam. This sea "mussel" was represented by a few broken valves in each of the *Donax* layers. It occurs along the Atlantic coast from Nova Scotia to Georgia.

26. *Ostrea virginica* Gmel. A number of isolated deposits of the valves of the common oyster were found in the upper two layers of the mound; but none in any of the lower layers. This is strange when taken in connection with the facts that this oyster is common in the Halifax River, and that, according to the extract by Wyman, already quoted, the large mounds along the coast to the south are composed mostly of the shells of oysters.

27. *Pecten dislocatus* Say. Professor Hitchcock found a number of valves of this marine form scattered among the layers of *Donax*. It is at present abundant from Cape Hatteras to the straits of Florida.

28. *Anomia simplex* Orbig. A few valves were found in all the layers, but it was more common in the lower ones. It occurs along the entire Atlantic coast.

Besides the above named shells, the remains of a barnacle, *Balanus sp.?* occur occasionally in most, if not all, of the shell layers of the mound.

A number of bones and fragments of bones from the different layers of the mound were taken home with me and submitted to Dr. O. P. Hay, of the

Pl. X.

My Main Excavation in the Ormond Shell Mound.

American Museum of Natural History. He reports that these consist of the following:

Virginia deer, *Cariacus virginianus* Bod. Bones of skull and limbs.

Dog or small wolf, *Canis sp.?* Jaws and teeth of.

Porpoise. Tail vertebræ of.

Great Auk, *Plautus impennis* L. Humerus of.

Gopher, *Xerobates polyphemus* Daudin. Bones of.

Alligator snapping turtle, *Macrochelys temminckii* Troost. Bones of.

Sharks, two species. Vertebræ of.

*Bony fish, *Chætodipterus sp.?* Interspinal bones of.

Of these by far the most interesting and unlooked for is the humerus of the extinct Great Auk, which was taken at about the middle of the thickest layer of shells (No. 3 of the section), near the point where my hand rests in the accompanying plate. This bird, "which lost the use of its wings and perished off the earth in consequence," has heretofore been supposed to have limited its range to the North Atlantic Region. The Great Auk was formerly common on the coast of Iceland and found in vast numbers off the coast of Newfoundland, especially at Funk Island. It was a little larger than a goose, and formed an im-

*Prof. C. H. Hitchcock, in a subsequent excavation in the mound, secured the bones of several other animals, which have been identified by Dr. Hay as follows: Raccoon, opossum, heron, alligator, gar pike, wolf fish, angel fish, cat fish, and other fish of the genera *Sphyræna* and *Prionotus*.

portant article of food for the early navigators and fishermen. Being incapable of flight it was easily captured on land and was taken in great numbers at its breeding places. Systematic slaughter of the bird

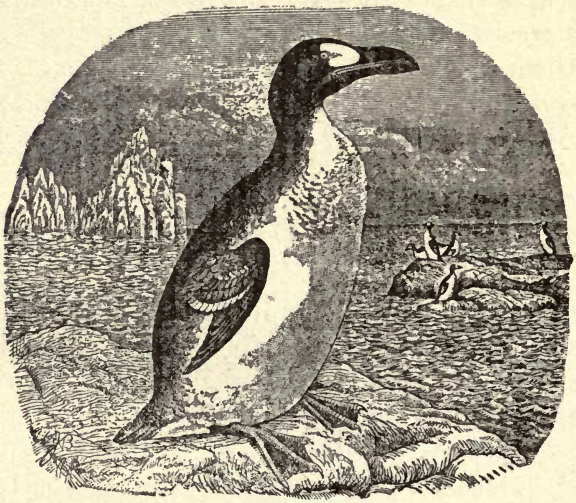


Fig. 53—Great Auk.

for its flesh and feathers caused its extermination about 1840. Previous to my excavations in the Ormond mound its remains had been found from Newfoundland southward as far as the coast of Massachusetts, but not below that State. The finding of its bones in this East Florida shell mound was, therefore, a remarkable extension of its range.

In the spring of 1902 an account of my discovery of the Great Auk bone in the Ormond mound was

published quite widely in the newspapers, and was noted by Prof. C. H. Hitchcock, of Dartmouth College, who was then visiting Ormond. He immediately began explorations in the mound and was fortunate enough to find another humerus of the bird. This was first shown to Prof. F. A. Lucas, of the U. S. National Museum, and was afterward turned over to Dr. Hay. These authorities both agreed that the two humeri are undoubtedly those of the auk and belong to the same side, the left, therefore representing two distinct individuals.

In a letter to me, Prof. Hitchcock states that his excavation was about thirty feet southwest of the one in which I found the auk bone, and that his bone came from the layer of shells at the very base of the deposit, and was therefore beneath eight feet of shells and mold.

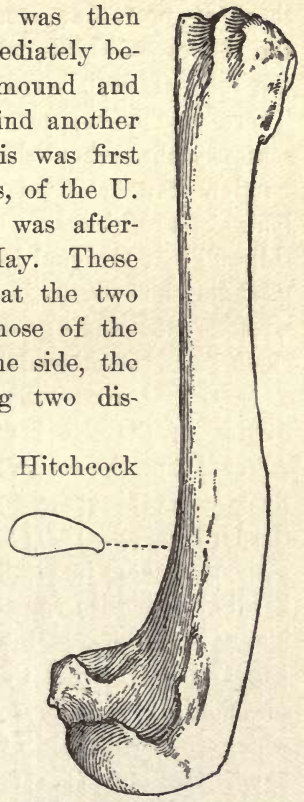


Fig. 54—Left humerus of the Great Auk, taken from Shell Mound at Ormond, in April, 1899. Natural size.

(The cross section shows the flattened character of the bone.)

Taking into consideration the fact that both auk bones were found in

the lower portion of the mound, and were integral parts of the shell layers which surrounded them, there is no other conclusion but that they are the bones of birds which served as a part of the food of the aborigines who formed the mound. There may be numerous other remains of the auk scattered throughout the mound, as only a very small portion of it has been examined. Moreover, many bones of the bird may have been hauled out to the sidewalks of Ormond in the past, as the material is used for those walks just as it occurs in the mound, without screening or other process of separating the shells from the other debris.

Dr. Hay has recently published an account of the finding of the two bones in the Ormond mound.* After stating the facts relative to their discovery, and those concerning the former known distribution of the bird, he adds: "That the Great Auk was a permanent resident in Florida is very doubtful. We can hardly argue with respect to the shell heaps of Florida, as Hardy has maintained in the case of the New England heaps, that they were built up during the summer, and that hence the bones are those of auks which were captured at that season. On the other hand, Ormond is a thousand miles distant in a straight line from Cape Cod, and eighteen hundred from Newfoundland; and either of these distances would be a long trip for a wingless bird to make and

*The Auk, July, 1902, p. 255.

repeat in half a year, even though its swimming powers were very great. We shall, however, probably yet learn that the Great Auk was a permanent resident along our coast considerably further south than Cape Cod. For the further elucidation of this subject, search ought to be made in shell heaps all along the coast."

Fragments of pottery occur in all the shell layers of the Ormond mound. Those in the lower layers are, for the most part, thicker and cruder in structure than those of the upper. Their outer surface is wholly unmarked, and there is no appearance of a rim or thicker projecting portion at the top. In some of the pieces the curves are not true and the thickness not uniform. Two or three have holes in them near the top, presumably for a handle or bail for lifting or suspending above a fire. This bail was probably of bark fiber.

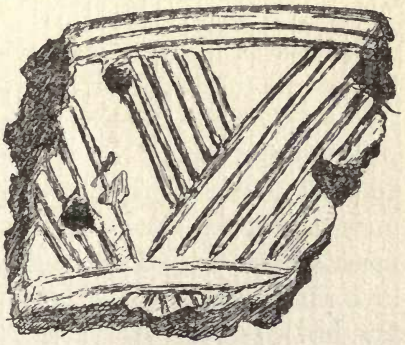


Fig. 55—Piece of Pottery taken from Ormond Shell Mound.

The pieces taken from the upper layers of the mound are many of them more or less decorated on the outer surface. These decorations are, in the main, rough parallel tracings

made with some pointed instrument. In several of the pieces (Fig. 55) sets of parallel lines are arranged so that they meet at an angle. In one instance a design of regular and symmetrical squares, one within another, is present (Fig 56).

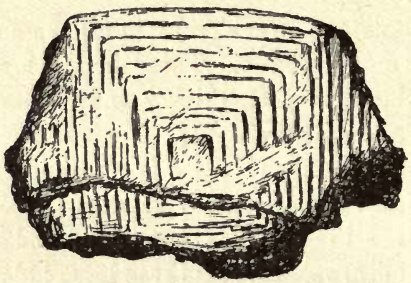


Fig. 56—Piece of Pottery taken from Ormond Shell Mound.

Several of the fragments with traced markings have a rim much thicker than the sides of the vessel. In the one represented by Fig 55, the rim is 21 mm. thick, while the lower part of the piece is but 10 mm. In another fragment, with the outer surface undecorated, the rim is 31 mm. thick, and has its upper surface marked with numerous sets of parallel lines which meet each other at different angles, while the thickness of the sides is but 9 mm. In this piece the rim projects both outwardly and inwardly above the sides, but the inner projection is much more marked. It is evidently a part of a large jar rather

than a cooking vessel, as its outer side is not smoke begrimed.

But one or two of the pieces taken have their surface stamped. The markings of these were a series of straight ridges crossing each other at right angles, thus forming depressed squares of small size.

The material of which the pottery was composed was, in most all instances, evidently clay free from sand or shells. In most cases the outer and inner surface is smooth, except for the markings above mentioned, and dense, while the middle portion is much darker and quite porous. This porosity is due to an admixture of vegetable fibers which were destroyed during the process of burning, each fiber leaving in its place a small pore or canal. In some of the poorly burned specimens the remains of the fibers are still present. It seems that in finishing the vessel, after it had been formed of fibers and clay, the makers covered the inner and outer surfaces with a thin layer or "skimming" of clay alone, thus preventing the presence of the pores on these surfaces. Pieces of two vessels showed the presence of quite a quantity of sand mixed with the clay. These were from the lower portion of the mound.

Mr. Bristol presented me with a piece of a stone vessel which he had taken from a load of shells hauled from the mound for a sidewalk in front of his residence. It is evidently a portion of a large mortar or bowl, made of a reddish gray steatite or soapstone.

It is very smooth on the inside, rough and smoke begrimed without. Its size is two by four and a half inches and its thickness about three-quarters of an inch, or 17 to 19 mm. Other smaller fragments of the same material were seen in the load of shells by Mr. B., but were not saved.

The piece given me was submitted to Dr. W. J. McGee, of the Bureau of American Ethnology at Washington, who reported on it as follows: "The fragment of a large steatite pot mentioned in your note has just come to hand. The vessel was evidently of considerable size and excellent finish for this material. The specimen is of interest as indicating a wide distribution of steatite pottery. The best known aboriginal steatite quarries are in the Piedmont region, in a belt extending from about the Delaware River southward nearly or quite to the Savannah; but there is no probability that the material was quarried nearer to Ormond than northwestern Georgia, while the utensil represented by your specimen may perhaps have been transported much farther than this. Ordinarily the steatite pots are elliptical or of a broad boat-shape, with projecting handles (sometimes carved into rude effigies) at either end; your specimen may represent the side of such a pot, though its curvature suggests that it may be from a specimen of more nearly cylindrical cross-section."

Aside from the pieces of pottery, the only artificial objects found during my investigation of the mound

were a piece of a bone awl, two inches in length and having the surface well polished, and a concave disk of bone, 37 mm. in diameter, and 5 mm. thick, with a hole 8 mm. in diameter, drilled through the center.*

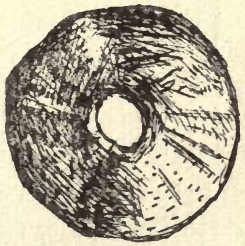


Fig. 57—Bone Ornament taken from Ormond Shell Mound.

From the facts ascertained and mentioned concerning this mound, and especially from the manner in which the layers of shells, with their accompaniments of bones, pieces of pottery, charcoal, etc., are arranged, there can be no doubt but that it is a kitchen-midden or accumulation of refuse material made about the dwellings of a people who inhabited this spot hundreds of years before the white man landed on the shores of Florida. It is wholly impossible that such an accumulation of shells and such a combination of objects could have been formed by natural causes. Of the people who made the mound, whether Indians, Mound Builders, or what, not even tradition remaineth. The Red Men who were here when the Spaniards came have asserted time and again that this and other shell mounds of the State were present as they are to-day, as far back as their ancestry had records. The mound, then, is but a re-

* Prof. Hitchcock reports the finding of some bone points and awls with ornamental ends, but without eyes.

minder of the feasts of a forgotten race—a vast pile of shells, bones and broken utensils which serves as the sole monument of a people that has vanished from the earth.

April 9, 1899.—'Tis Sunday morn once more—the last Sabbath of my sojourn in the "Cracker State." A cold wind blows from the north and the mercury stands at 48° at breakfast time. A stove is a comfort at almost mid-April in the "Land of Flowers."

I make my way to Bennett's grove. The temperature rises by the time I reach there and begin my search for reptile, mollusk and insect.

I find here my first living examples of the large pinkish univalve mollusk, *Glandina truncata* Gmelin. When living and full grown it is one of the largest and most handsome of our North American terrestrial mollusks, reaching at times 100 mm., or four inches in length. Their dead shells, which I have found in various places heretofore, have been bleached by rain and frost. The living ones are prettily tinted with rose color or pinkish. This species inhabits the Atlantic and Gulf States from North Carolina to Texas. Binney has written of it: "The habits of this mollusk are somewhat aquatic. It is found on the sea islands of Georgia and around the keys and everglades of Florida, and in these situations the shell often attains the length of four inches. Mr. Say found it in the marshes immediately behind the sand-hills of the coast. It is most readily found in

the center of the clumps of coarse grass on these marshes. The animal is in part, if not altogether, carnivorous, and its powerful lingual membrane, armed with long, sharp-pointed teeth, is well adapted to its food. By its action the soft parts of its prey are rapidly rasped away or are forced in large morsels down the œsophagus. It has been seen to swallow entire the half-putrid remains of another land snail, a *Helix*, and to attack slugs, *Limaces*, confined in the same box with it, rasping off large portions of the integument, and in some instances destroying them. In one instance an individual attacked and devoured one of its own species, thrusting its long neck into the interior of the shell and removing all the viscera."*

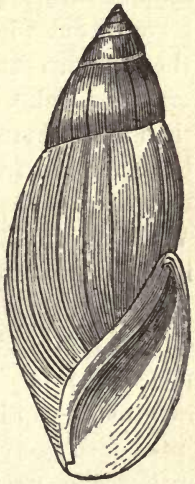


Fig. 58—*Glandina truncata* Gmel. (After Binney.)

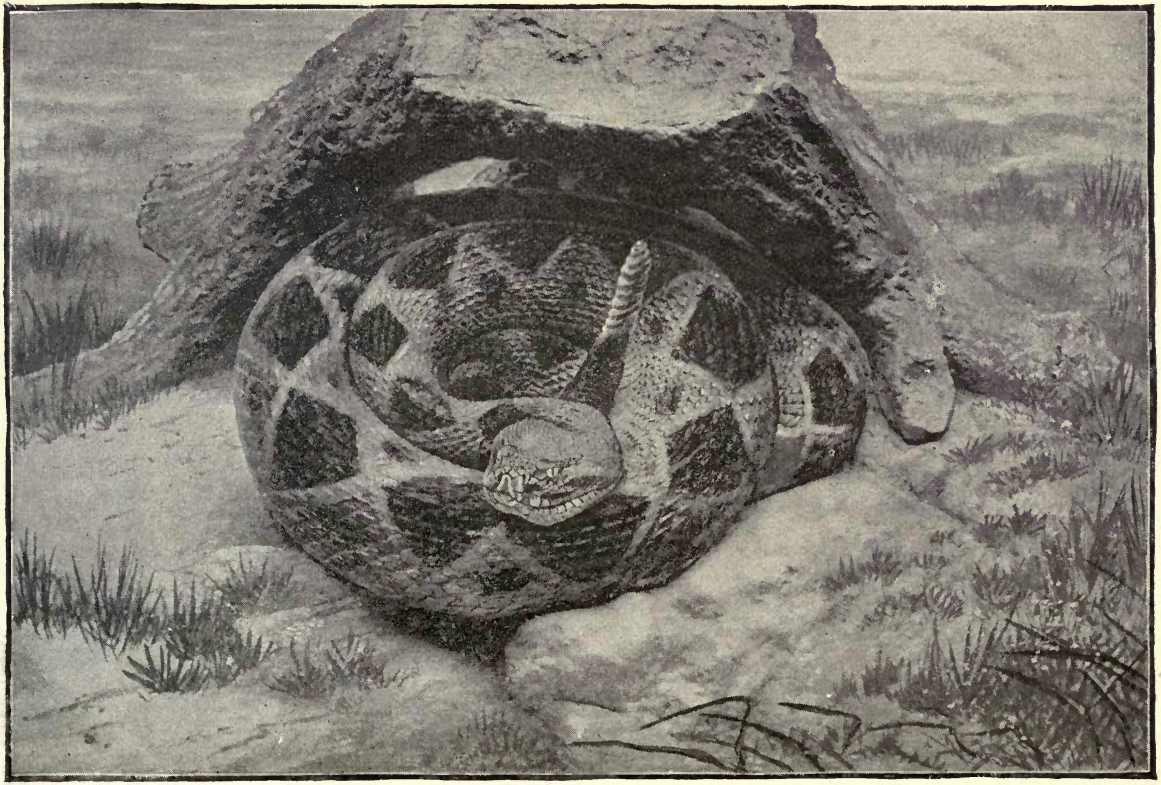
A single example of another smaller and prettily marked shell, found to-day for the first time, is *Bulimulus dormani* Binney, whose known range is restricted to Florida. It is elongate-conic in form, an inch and a fourth in length, and of a light flesh color, with several revolving lines of interrupted reddish-brown patches. A dead specimen of a large Planor-

*Manual of American Land Shells, 1885, p. 349.

bis, *P. glabratus* Say, is also secured from the side of a ditch.

A large spotted frog leaps from before me and alights with a plunk in the water of the ditch. I scoop it out with my butterfly net, and find it to be the southern form of the common leopard frog, *Rana virescens* Kalm. The head is longer and more pointed than in northern examples, and there is no lengthwise band on the front of femur. Cope has given the name *sphenocephala* to this long-headed variety. While mostly southern in its range, it has been found in the cypress swamps of Knox County, Indiana.

Though I have been on the lookout for rattlesnakes during my rambles about Ormond, I have not happened upon a single specimen. To-day, however, I saw one in captivity which was captured near here a week or so ago. It is a small specimen of the diamond rattlesnake, *Crotalus adamanteus* Beauvois. This is the common rattlesnake of Florida, and is said to reach a length of eight feet. Many improbable tales are told hereabouts of this reptile. Mr. Bennett avers that an average of one person a year dies in this (Volusia) county from its bite. Probably one in a dozen years would be nearer the truth. He states also that he killed an old snake and twelve young, which were accompanying her as chickens follow a hen. Another citizen of the town affirms that he has seen the bodies of two black snakes which, when cut open, disclosed rattlesnakes which they had swallowed. One



THE DIAMOND RATTLESNAKE.

Crotalus adamanteus Beauv. (After Stejneger.)

of these he saw capture the rattler. The black snake crawled rapidly around its intended victim, as the latter lay coiled. The head of the rattlesnake turned at the same time, its eye all the time fixed upon its enemy. Finally it seemed to grow dizzy and its head fell down, when the black snake immediately sprang to the attack and swallowed its victim head first.

More probable is the following account of the habits of the diamond rattler by Dr. Einar Lœnnberg, who has studied for a number of years the reptiles found in eastern Florida: "In the interior of the country the diamond-backed rattlesnake is scarce, but not so along the coast and on some of the Florida keys. In the neighborhood of Ozona, in Hillsboro County, I heard of the killing of nine rattlesnakes within two weeks in October, 1892. It evidently prefers the neighborhood of the water, and is a good swimmer, not afraid to cross over from 'key' to 'key.' If not too often disturbed this species is slow and does not rattle unless offended. I saw one in the latter part of October in the pine woods near Toronto, Orange County, coiled up under a palmetto bush. A dog following us went up and sniffed at him, with his nose hardly a foot from the snake. We called the dog back and a man ran forward with a whip and struck the snake several times. After the second blow the snake began to rattle and made himself ready to strike. This shows plainly the slow nature of the snake. In other cases they are more easily

offended. Those kept in boxes and cages often begin to rattle as soon as they see anybody approaching. They are easy to keep alive, and take food without trouble. I saw one that was kept in a small box and was fed with toads; it did so well there that it changed its skin twice in a summer. They are often kept in the shops of taxidermists and in 'curiosity stores,' where Northern tourists buy them, paying good prices. The skin is often used for ornaments or for the manufacture of pocketbooks and similar objects.

"People are very seldom bitten by rattlesnakes in Florida. The rattling, the strong odor, and the slowness of the snake are protective. This snake is often caught by placing an empty barrel over the coils, after which a board is shoved under the reptile and the whole thing turned over."*

Besides the diamond rattlesnake, the small ground rattler, *Sistrurus miliarius* L., closely allied to the northern massasauga or prairie rattlesnake, occurs throughout Florida. The other poisonous reptiles of the State are the water-moccasin or "cotton-mouth," *Ancistrodon piscivorus* Lacepede, and the coral or bead snake, *Elaps fulvius* L., both of which range north to southern Indiana. The former belongs to the same genus as the copperhead of the north. The coral snake is a handsome reptile, being possessed of a slender body which is encircled by alternate bands of jet black and bright red, fourteen to nineteen of

* Proc. U. S. Nat. Mus., XVII, 1894, p. 335.

each, the latter color merging into yellow at the edges of the rings. Much discussion has taken place concerning the ability of the coral snake to inflict a dangerous bite, mainly on account of the smallness of its mouth and the shortness of its fangs. Dr. Lœnnberg, however, records the death of a Swede whom he knew at Oakland, Orange County, the man dying twelve hours after being bitten by one of these reptiles. He also states that he had heard of several other cases of boys dying from the effect of the *Elaps*' bite. He adds: "*Elaps fulvius* is, however, a good-natured snake, and it does not bite unless it is very much provoked. If not handled too roughly, it may be allowed to crawl on one's hands from one to the other. I have allowed it myself once, but I hardly think I would do it over again, and would not advise anybody else to try it."*

I saw none of these poisonous snakes about Ormond, though I heard all of them mentioned as being found there. The *Elaps* is said to be common there from mid-April until late autumn, being often plowed or dug up in the gardens, or disclosed to view when overturning logs or rubbish.

April 10, 1899.—This morning I seek the pine woods and the sun—a place where nature is open and generous—where the breezes freely play, soughing and soaring amidst the needles of the pines—where the sun shines only on pines, bunch grass and sand—

* Loc. cit., p. 334.

where smilax, saw palm, scrub oak and brambles are unknown. This morn a new life begins to stir within me. I know not how long it will last. I feel that new ambitions should be cherished in my soul, that the old should be forsaken; that new hopes should reign in my heart, that the old should be forgotten; that a new love of nature should be forever with me, that the old should belong to the eternity of the past.

I pause not until I reach the stream near the edge of the pine woods; a stream whose waters are clear, yet dark; rapid flowing, yet here and there forming quiet pools over which the dragonfly lurks, and around which his prey, the humming mosquito, unwittingly flits. Here I capture several fine dragonflies, slender bodied, dark winged, handsome examples of the species *Argia fumipennis* Burm., and *A. tibialis* Ram. One has a mosquito or allied insect in its mouth, and I disturb forever its breakfast.

Along the borders of this stream, as far as eye can see, is a tangled mass of smilax, wild grape, scrub oak, saw palmetto and many other forms of creeping and thorny shrubs and vines; the whole forming a mass through which a man would have difficulty in forcing his way, but among which the moccasin, rattlesnake, alligator, mud puppy, raccoon, otter and other noxious and innoxious mud-loving forms delight, and through which they pass with ease.

High over the pine woods an osprey soars. What seeks he there? No mullet or minnow swims amidst

these sands. Perchance he is looking for a snake with which to break the monotony of his piscatorial meals. Perhaps a mouse, a wood rat, or even a rabbit is occasionally relished by this fish-eating bird.

The red-eyed vireo sings as merrily and unceasingly as on a day in mid-May in Indiana. The flowering dogwood, *Cornus florida* L., blossoms here as there. They take me back to other days when I chased the slender black *Argia* dragonflies along a slow flowing, purling brooklet — of other days when a bevy of happy young folks— their hearts full of joy—their souls unused to care— followed where I led, and listened to my tales of the life of a dragonfly. For, in those days, I, as well as they,

Fig. 59—Red-eyed Vireo.
Vireo olivaceus L.

> "Saw the dragonfly
> Come from the pools where he did lie.
>
> "An inner impulse rent the veil
> Of his old husk: from head to tail
> Came out clear plates of sapphire mail.
>
> "He dried his wings; like gauze they grew.
> Thro' crofts and pastures wet with dew,
> A living flash of light he flew."

Once again I sit in the threshold of the deserted cabin in the pine woods. The sensitive brier, *Schrankia horridula* Michx., with its prickly prostrate stems, grows in clumps around the cabin. Here also are two species of handsome yellow Compositæ, showing the full beauty of their first spring blooms. The little ground doves, paired for life, run in the sandy pathway which leads away from the cabin doorway. The sun, master of all, shines brightly o'er me as I write. 'Tis a perfect April day, mild in temperature, balmy of breeze.

The field naturalist should ever seek new environments, look in new places, turn over new logs, pull the bark from new dead snags, cast aside the gloomy thoughts of what he is or what he may be, and live and dream only of the sunny, joyous present. Would that I could practice each day what I say unto myself, "That should I do." By turning to one side and visiting a nook of these woods isolated from the main tract, I have found this morning a pair of small brown Tryxalid locusts, *Macneillia obscura* Scudd., of which but four specimens, from Fort Reed, Florida, have heretofore been known. Near them I take also two females of an undescribed allied form. It is an *Eritettix*, four-fifths of an inch in length; brown, with an ivory white median line two mm. wide extending from the tip of the fastigium to the end of elytra. I shall call it *E. sylvestrus*—meaning "of the

woods." Thus have I been rewarded for visiting this nook.

On my way home I capture the male of a dog's head butterfly, *Colias cæsonia* Stoll, fresh from its winter

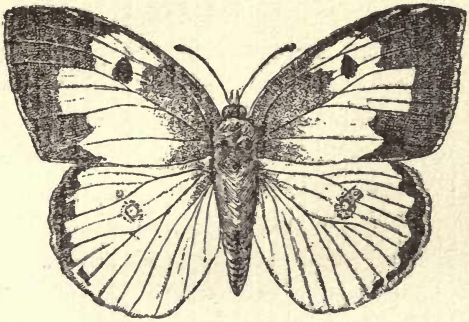


Fig. 60—Dog's Head Butterfly.
(After French.)

chrysalis. The yellow portion of the upper surface of the front wing is so surrounded with black as to resemble a dog's head, the discal dot of black answering for an eye. His is a wide range. 'Neath the tropical sun of Mexico, the temperate sky of Indiana and the blue of the Florida ether I have seen him winging his onward way and have added him to my treasures.

April 11, 1899.—I am sitting as I write, on a branch or fork of an old live oak near the center of the mound of shells. At my right the roadway, sere and brown with fallen leaves, leads onward between rows of tall palmettos and lofty pines. On and on

it goes, as far as eye can reach, forming one of the most pleasing vistas among the noteworthy scenes of this fair land. Two miles beyond this mound the road reaches the end of the "Old Causeway," that portion of the old St. Augustine trail which was constructed across the broad marsh by the Spanish or English planters, to enable them to reach the ferry at "Buckhead Bluff" on the Tomoka. The Causeway passes, for part of its way, along the bank of Thompson's Creek, a tributary of the Tomoka. The still, deep waters of this stream are said to be well stocked with black and channel bass, sea trout and other forms of game fish, while alligators, musquash and otter dwell along its shores.

As I sit here my thoughts revert to the race of old —prehistoric—ante-red-man—a people of whom we know little or nothing, who at one time resided here. Through these forest glades, when returning from the chase, their cries of triumph were echoed. Here in a land of sunshine their wants were few and easily satisfied; their ambitions lowly, their hopes eternal. Hunger and thirst only did they have to allay. All else was theirs for the seeking. Did they need shelter, the leaves of the palmetto furnished it in plenty. Food, the waves of the ocean brought it to their feet. Theirs but to love, woo, mate, beget their progeny and die. A happy, contented people they must have been. Had not other and stronger races found them out, coveted their possessions and made success-

A Portion of the Old Causeway.

Showing the rows of Cabbage Palmettos along its borders.

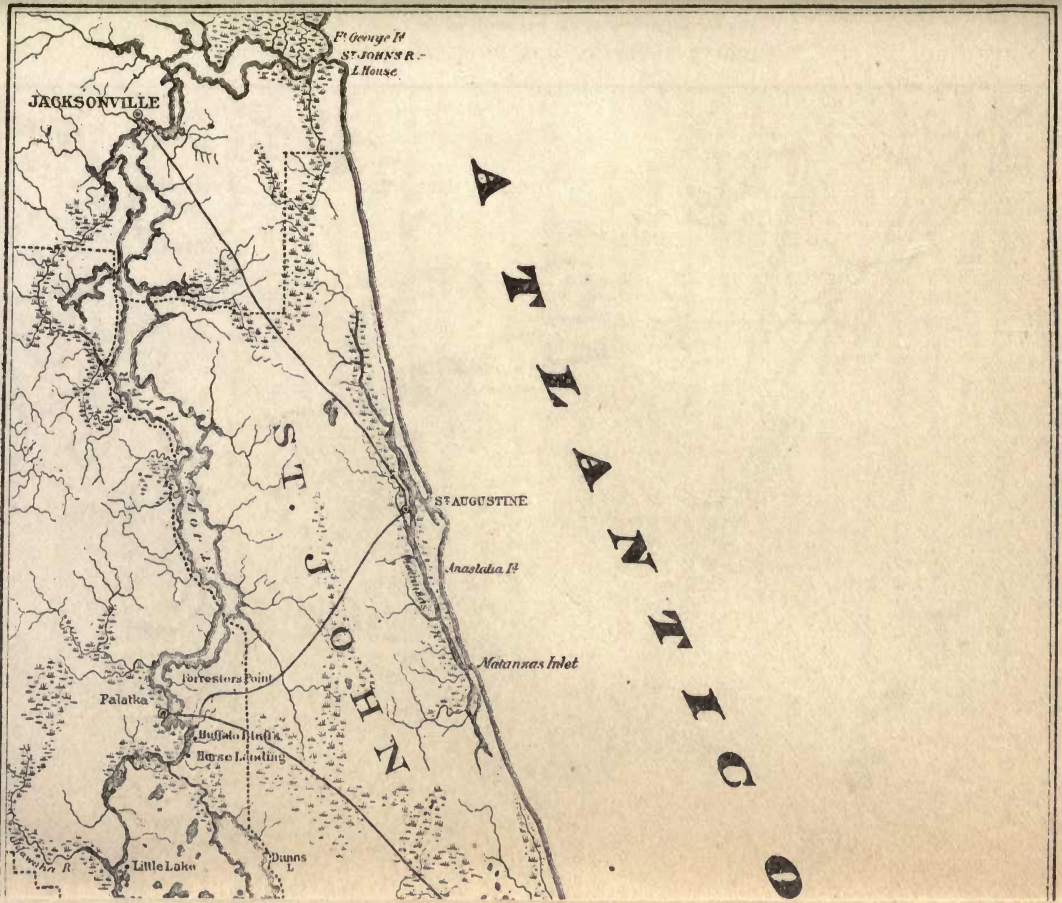
ful war upon them, here still they might be found, ignorant, innocent, contented, and for that innocence and contentment to be envied by such as we—we who profess to be wise and therefore ever live in an envious frame of mind, possessed of a discontented soul.

'Tis afternoon, and for the last time I sit beside my pine tree, whose crown each dawn doth greet the first ray of the rising sun. For the last time I have been through the old orange orchard seeking therein what I might find. For the last time I have trodden the woodland path which leads by the vacant house. Many times during the past five weeks have I passed along these pathways. Many times have I sat where I now am, with my head, aweary, resting against the pine. From to-day on, perhaps forever, I am a stranger to this land. From to-day on its sun will shine as brightly, its breezes blow as balmily, its pines nod as gracefully and its surf roar as soothingly, but they will bring not peace nor contentment to my soul, nor health and strength to my body. A long farewell to thee, O, Ormond by the Sea!

A DAY ON THE UPPER ST. JOHN'S RIVER.

"Rivers are the constant lure, when they flow by our doors, to distant enterprise and adventure. * * * * They are the natural highways of all nations, not only leveling the ground and removing obstacles from the path of the traveler, quenching his thirst and bearing him on their bosoms, but conducting him through the most interesting scenery, * * * and where the animal and vegetable kingdoms attain their greatest perfection."—*Thoreau*.

The St. John's stands unique among the rivers of America in that its headwaters are on a level but about six feet above that of the Atlantic whose coast it parallels. Again, its general course is northerly, so that in ascending the river one is traveling southward. It drains the eastern portion of the northern half of Florida, traversing a low, sandy region, but following a very winding course so that its extreme length is about 300 miles. In its upper third, or from its mouth to Palatka, where I boarded the steamer for my trip along its upper course, the appearance of the river is that of a wide inlet from the sea. It is here a tide-water stream, in places two or three miles in width, and with straight stretches of sufficient length to give a water horizon. Above Palatka it gradually narrows, until at the outlet of Lake Monroe its breadth is reduced to one hundred and fifty feet.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Forresters Point
Palatka
Horse Landing
Little Lake
Dunns
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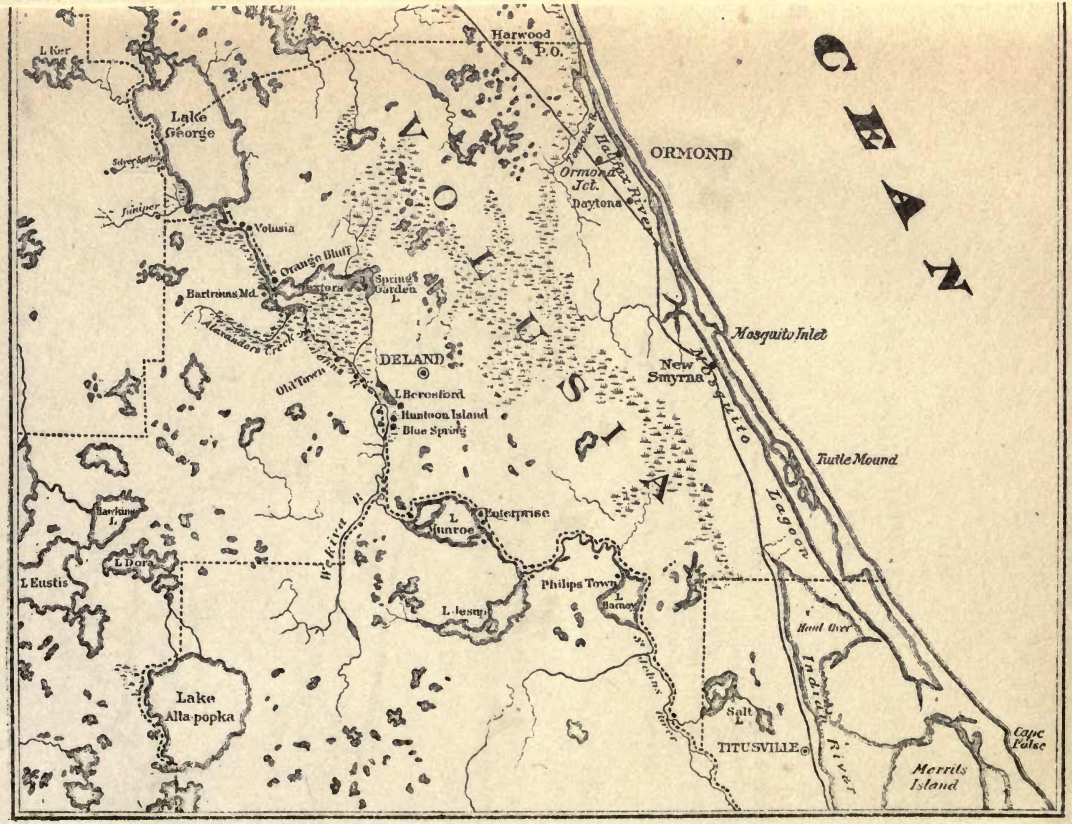

MAP OF A PORTION OF NORTHEASTERN FLORIDA.

Showing the St. John's River and the Region about Ormond.

Three enlargements, termed lakes, are traversed by the river. The lower and larger of these is Lake George, about forty miles above Palatka, which has an extreme length of thirteen miles, and a breadth of six to eight miles. The others, Lakes Monroe and Harney, are a little less than half this size. At present the larger river steamers ascend only to Sanford and Enterprise on the shores of Lake Monroe.

Besides the lakes mentioned, through which the river passes, a number of others of considerable size lie a few miles distant from it, and their overflowing waters enter its channel through tributaries. The chief ones of these are Dunn's Lake, Lake Dexter, Lake Beresford and Lake Jessup.

The headwaters of the St. John's, according to Prof. Wyman, are "in Lakes Washington, Winder and Poinsett and the adjoining swamps south of these, to which must be added the swamps between the lakes just mentioned and Lake Harney, all of which together have an area of several hundred square miles, and form great reservoirs in which the summer rains are collected. These head waters are separated by low land, rising but little above their level, from an extensive chain of lakes which have an outlet southward into the Kissimmee and thence into the great lake of Okeechobee. When the river is at its highest level, just after the rainy season, it is said that the sources of the two rivers flowing north and south, viz.,

the St. John's and the Kissimmee, come so near together as almost to communicate.

"The river has its annual rise and fall, which occur with great regularity. The maximum rainfall over its basin is in June, July and August, when it amounts, along the head waters, to about twenty inches for the three months, and the least is in December, January and February, when it does not exceed six inches for the same period. During the rainy season the reservoirs of the St. John's, consisting of the combined lakes and swamps already noticed, as well as those of the Oklawaha, in the aggregate having a surface of many hundreds of square miles, receive immense quantities of water, which are gradually discharged through these two rivers. In consequence of the slight difference of level existing between the river and its shores a somewhat extensive inundation takes place in its middle portion.

"The high level of the river is maintained for a time by the steady outflow from the reservoirs, but in the course of the spring the water recedes, leaving behind deposits of mud, remnants of aquatic plants, and various kinds of drift material, all of which are gradually converting the swamps into dry land."

April 12, 1899.—I awaken at 5 o'clock, after a night of fitful slumber, on board the "City of Jacksonville,"* a river steamer plying between Jack-

* I had taken the boat at Palatka at ten o'clock the evening before.

sonville and Sanford. Hurriedly dressing and donning an overcoat as a protection against the cool and bracing air, I make my way to the forward deck. The sun, just peering above the horizon, is beginning to scatter the few wisps of mist which linger along the banks of the river. I ascertain from a deck hand that we have just left Astor, a landing about ten miles above Lake George. The stream, here about one hundred yards wide, winds its way between densely wooded banks. The timber is mostly hard wood; oak, elm, sweet-gum, hickory, cypress, bay, etc., all more or less encumbered with the swinging tufts of gray Spanish moss. Occasionally a palm, tall and stately, rises amidst the other trees, or a grove of them covers some dike along the shore, their presence adding much to the semi-tropical aspect of the scene.

At times a bittern, *Botaurus lentiginosus* Montag., is flushed, rising with a "quawk" and winging its way before us to some sheltered cove. Blue herons are common, and occasionally as the prow of the boat turns a bend a snake-bird, *Anhinga anhinga* L., with long and slender neck, arises and flies up some inlet or high over the bordering forest. The range of this bird is through tropical and semi-tropical America north to southern Illinois, and casually to Indiana and Michigan. According to Bartram it was formerly very common on the St. John's, but like many other of the rarer birds and mammals has been driven to

the more retired creeks and lagoons by the senseless warfare of shot-gun and rifle waged upon them from the decks of the river steamers. In his "Travels" Bartram has noted its presence along the St. John's in the following language: "There is in this river and in the waters all over Florida, a very curious and handsome species of bird; the people call them Snake Birds; I think I have seen paintings of them on the Chinese screens and other India pictures. They seem to be a species of cormorant or loon, but far more beautiful and delicately formed than any other species that I have ever seen. The head and neck of this bird are extremely small and slender, the latter very long, indeed, almost out of all proportion; the bill long, straight and slender, tapering from its ball to a sharp point; all the upper side, the abdomen and thighs, are as black and glossy as a raven's, covered with feathers so firm and elastic that they in some degree resemble fish scales. The breast and upper part of the belly are covered with feathers of a cream

Fig. 61—Snake Bird.

color, the tail is very long, of a deep black, and tipped with a silvery white, and when spread, represents an unfurled fan. They delight to sit in little peaceable communities, on the dry limbs of trees, hanging over the still waters, with their wings and tails expanded, I suppose to cool and air themselves when at the same time they behold their images in the watery mirror. At such times, when we approach them, they drop off the limbs into the water as if dead, and for a minute or two are not to be seen; when, on a sudden, at a vast distance, their long, slender head and neck only appear and have very much the appearance of a snake and no other part of them is to be seen when swimming in the water, except sometimes the tip end of their tail. In the heat of the day they are seen in great numbers, sailing very high in the air, over lakes and rivers.

"I doubt not but if this bird had been an inhabitant of the Tiber in Ovid's days, it would have furnished him with a subject for some beautiful and entertaining metamorphoses. I believe it feeds entirely on fish, for its flesh smells and tastes intolerably strong of it; it is scarcely to be eaten unless constrained by insufferable hunger."*

Turning one of the many bends of the river a low, flat tract of land comes into view, stretching miles away to the left. It is covered with a species of saw

* Loc. cit., p. 130.

grass which grows so densely that stock can not penetrate it. Accessible to man only when he cuts his pathway before him, it is said to be inhabited by snakes, raccoons, 'possums and marsh rabbits. The soil of this and many similar tracts is a rich vegetable muck, but will be wholly worthless until the time comes, if it ever does, when the St. John's will be drained out to the sea, eighteen to thirty miles to the eastward.

The first stop after dawn is at St. Francis, which occupies a strip of somewhat higher ground, and is composed of a dozen or more large frame houses located some distance back from the landing. A dead orange grove takes up much of the space about the town. Numerous sacks of corn and other freight are unloaded and several deck passengers disembark. On consulting a folder, I find that these passengers, who have been up all night, pay $1.00 each from Jacksonville to St. Francis and points beyond to Sanford, while cabin passengers pay $3.50, including meals and berth.

At several places along the banks large barges are moored on which stationary engines are standing. About the barges are immense rafts of cypress and other trees. I am informed that lumber companies from the north have recently bought up great tracts of timber bordering the river. The engines are used to "snake" or drag out the logs, sometimes from a half mile back from the water. The rafts, when

completed, are then floated down the stream to sawmills located convenient to railways.

A gentleman from Ocala tells me that much money is made in Central Florida by raising cattle, which are allowed to run wild. A three-year-old steer brings $20 and costs nothing except the expense of an occasional round-up. All cultivated land is fenced, and the remainder, forming the range, is free to all. For cattle or cows killed by railways the owners receive $12 each. Another gentleman avers that the turpentine business is the only paying one in Florida. Good tracts of the long-leaved pine which yields the turpentine can be bought for $1.50 per acre. With a capital of $5,000 to invest, a man, if possessed of sufficient energy, can become wealthy in a few years.

Stops are made at Crow's Bluff and Hawkinsville, both small towns on strips of high land adjoining the river. The pilot of the boat is a negro. He and his assistant, a boy who is evidently learning the river, have hard work rounding some of the abrupt bends, especially above the inlet from Beresford Lake, where the river contracts in places to but little more than one hundred feet in width. The boat, a very large one, moves slowly along these narrow stretches with little shaking or appreciable motion, though the engine heaves, pants and emits great volumes of smoke when rounding the bends.

Where the cabbage palmetto stands close to the water the stem rises from a great conical mass of

fibrous roots, ten feet in circumference and three or four feet above the water's level. These root masses resemble haycocks, with the tall, straight stem rising from their apex—a stem devoid of branch, devoid of bark and with only a tuft of leaves at the top—most striking of the vegetable kingdom along the river when growing thus.

An aquatic plant which is exceedingly abundant in all the inlets and bays opening into the upper two-thirds of the St. John's, as well as bordering the shores everywhere along its slower flowing stretches, is the water hyacinth, *Piaropus crassipes* Mart. It is a native of tropical South America, and on account of its clusters of handsome, light blue flowers, was introduced into the southern United States. Here it has flourished so freely that it has become a serious menace to navigation; so much so, indeed, that it has been the subject of special legislation by Congress, and has been treated in a special bulletin of the U. S. Division of Botany.*

The plant is aquatic and is usually found floating on the surface of the water. The roots may, however, attach themselves to the soft mud along the banks and the plant thus become fixed. In such a location, however, they are usually dwarfed in size, and if the soil becomes comparatively dry the plants will soon die.

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* "The Water Hyacinth and its Relation to Navigation in Florida." Bull. No. 18, U. S. Division of Botany, 1897.

The leaves of the water hyacinth form a rosette a foot or more in height which remains above the water as the plant floats. The basal portions of the leaves of

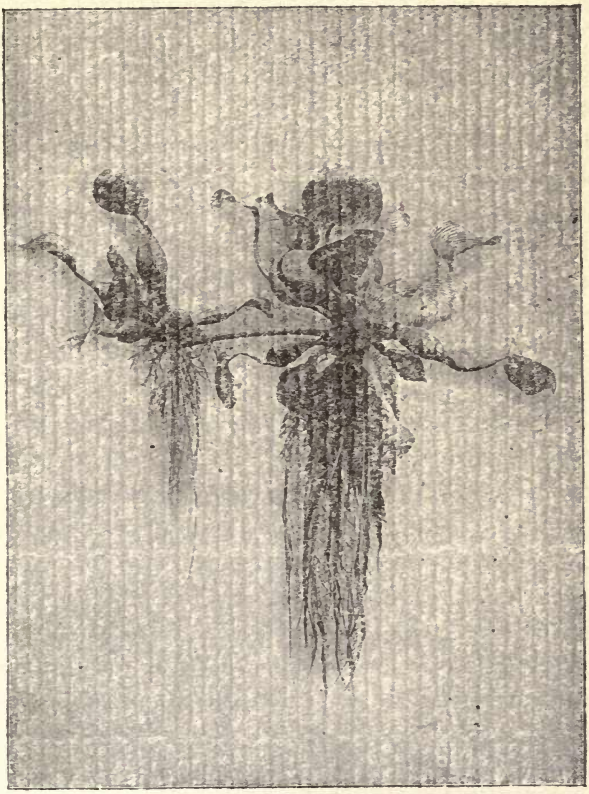

Fig. 62—Water Hyacinth.
(From Bull. 18, U. S. Div. Bot.).

young plants are swollen into bulbs which contain air cavities. These serve as buoys to keep the plant above water and prevent it from being overturned by wind or waves. The leaves, flowering stems and roots of the old plants become so thoroughly matted together that they are with difficulty torn apart, and are therefore in no danger of overturning. The roots form a dense fibrous mass, often two feet in length, which is submerged and absorbs food from the water. The plant flourishes best in sluggish fresh-water streams whose water is yellowish or brownish from the presence of an excess of organic matter. It will not live in salt or brackish water, and though floated down in large patches into the lower third of the St. John's, it there soon dies.

The plant was introduced into the St. John's about 1890 at Edgewater, four miles above Palatka. The refuse from a pond, in which it had been cultivated, was dumped into the river, and the hyacinth finding the slow-flowing, turbid water in every way suited to its needs entered on a stage of rapid growth and reproduction unprecedented in its history. In time it almost wholly blocked the river above the railway bridge at Palatka. Small boats with screw propellers found it impossible to penetrate a large mass of the plants, as the latter became entangled in the screw and prevented it from turning. Large steamers going at full speed come almost to a standstill when they strike a floating mass of the hyacinths. Floating logs

and other obstructions are often hidden among the plants and are struck by the boats. It is also estimated that lumbermen along the upper courses of the river have been damaged to an extent of $50,000 annually by the increased difficulty in rafting caused by the presence of the plant. The smaller tributaries in which the rafts are often formed have become so choked that they are useless for the purpose of forming and floating the rafts.

As our own steamer moves slowly onward the suction, caused by the water rushing in to fill the partial vacuum of the wake at the stern of the boat, breaks off large masses of the hyacinth, and causes them to move towards the center of the stream. Small colonies, perchance a single plant, come floating by, moving onward like a fairy boat, buoyed up by the sponge-like air-filled bulbs. Innocent and worthy of admiration are they when thus seen singly, but a veritable scourge when present in vast numbers.

At intervals I see cows and cattle along the edges of the marshes close to the river, their bodies immersed to above the middle of their sides, as they browse upon the floating aquatic mosses, hyacinths, etc. A passenger, on seeing them, states that it is a common thing for the cows in this section of the State to dive for mosses and while so doing to impale a number of fish on their horns. When they go home at night the children remove the fish and prepare them for supper, while the mother milks the

cows, the bovines thus furnishing both flesh and milk for the family meal. Another passenger asserts that "The Lord made the earth in six days, and, when Florida was but half finished, rested on the seventh. He then forgot to complete his work." One can not vouch for the accuracy of either statement.

Fig. 63—Bald Eagle.

Turning a sharp bend, we surprise a bald eagle with plumage worn and soiled, sitting with a half dozen carrion crows on some limbs near a fisherman's hut. The waters displaced by the boat move in immense waves rapidly shoreward and dash with force against the banks, swamping several rowboats there moored.

Just above the J., T. & K. W. Railway bridge the river, whose course is here almost due east, expands into Lake Monroe, a fine body of water, about six miles in length by four in breadth. On the right, or south shore is Sanford, a typical southern town of 2,100 population; while on the left or northern shore is Enterprise, a rival though smaller place. Before the 1895 freeze, which killed all the orange groves of this region, Sanford was more prosperous than now. This freeze disheartened for a time the citizens of

the town, but they are now beginning to engage in other enterprises and the place bids fair to soon recover its wonted activity of the "days before the freeze."

While the steamer, which is two hours behind time, is discharging and taking on freight, I take a stroll about several of the streets. The sidewalks I note are mostly of comminuted shells, and inquiry develops that they come from two shell mounds, each about three miles distant, one near the head of the lake, the other near the railway bridge above mentioned. The shells are seemingly all fresh water species, mainly of the genera *Ampullaria* and *Paludina*.

The small buzzards or "carrion crows" are common on the house-tops of Sanford, while ground doves are almost as plentiful in the streets as are English sparrows in the northern towns.

The steamer takes on many immense bales of palmetto fiber, which has been separated from the trunks of the cabbage palmetto by a large factory located in Sanford near the river. Numerous barges are unloading at this factory sections of the upper fifteen or twenty feet of the trunks of this tree. Leaving Sanford the steamer makes its way across to Enterprise, where, after discharging a miscellaneous lot of freight and loading the household furniture of two or three families of negroes, it starts on the return trip.

At Blue Springs Landing, which is but twelve miles from New Smyrna, an important town on the Atlan-

tic coast, a large spring of clear blue water wells up from a basin. A railway runs from here to New Smyrna, and much freight is brought here by river on account of the cheaper transportation. Among it to-day is an immense amount of baled hay from the north. At Crow's Bluff the steamer is flagged, and, on making the landing, a barrel of alligator skins is loaded, that being the sole incentive for the stop. The bluff is but a bank, whose surface is six feet above the level of the water. A turpentine camp is the principal thing in sight.

A short distance below the bluff a large alligator is seen to plunge headlong into the water from the bank where he has been basking. An hour afterward, or about mid-afternoon, when the air has become warm and the sun shines bright, they begin to be frequent. Sometimes a dozen or more are seen swimming near the bank, their heads and crests just visible above the turbid water. Others are stretched out on the level bank in some favorite sunning spot. However, they have been fired at so much from steamers that they usually plunge into the water long before we get close enough for a good view.

The reflections of the trees and other objects along shore in the dark water are most pleasing in the bright sunlight. Every twig, every spray of pendent moss, every clump of grass and bunch of hanging fibrous roots is plainly portrayed. Where the tree

bends over the water the tips of the festoons of moss in air seem to almost meet those in water. Leaning over the steamer's rail and gazing down one sees, as it were, a new world beneath him, and is tempted at times to leap overboard into the midst of the entrancing scene. A lazy kind of life this, whiling away the sunny hours watching for alligators from a steamer's deck and gazing upon the reflections in the waters deep and dark.

A few miles farther and the river begins to widen out into great bayous or lagoons of still, shallow water, in which the yellow pond lily, or spatterdock, *Nuphar advena* Ait., and the water hyacinth are engaged in a deadly struggle for existence. In general the waters in the main channel of the St. John's are deep, seldom less than fifteen feet, and in many places exceeding ninety feet, so that with a skillful pilot, boats of large size have little if any difficulty in navigating the stream. The current is everywhere sluggish, being only about a mile and a half an hour. Eight steamers ply regularly up and down the river and its main tributary, the Oklawaha, carrying mail, freight and passengers. Easy means of transportation and low freight rates are thus accorded all points along the stream.

At Astor is located a factory for separating tannic acid from the large, thick root-stocks or underground stems of the saw palmetto. Hundreds of cords of these root-stocks are piled up along the shore. The

town is of small size, and is noted only as being one of the terminals of the St. John's & Lake Eustice Railway.

Volusia, the next stop, is almost across the river. It was once the county seat of the county of the same name, but it is now an almost deserted place. A climbing rose bush, in the full glory of its blossoming tide is the most conspicuous object. The boat stops here long enough to allow a grocer to count out twenty dozen eggs, which he wishes to send to Jacksonville.

A half hour after leaving Volusia we enter Lake George through a dredged channel a quarter of a mile in length. Piles are sunk on each side of this channel to retard as much as possible its filling with the debris brought down by the river. This lake is the largest expansion of this remarkable stream. It is a pleasing body of water, thirteen miles in length from north to south, and about nine miles in greatest width. Before we reach the outlet at the northern end the shades of the coming night envelop us and our day on the upper St. John's is at an end.

APPENDIX.

A List of the Odonata (Dragonflies) Taken in the Vicinity of Ormond, Florida, in March and April, 1899.

While searching primarily for Orthoptera, Diurnal Lepidoptera and Coleoptera, such specimens of Dragonflies were taken as came readily to hand. These were in time submitted to Mr. E. B. Williamson, of Bluffton, Ind., a well known specialist of this group, who kindly determined them for me. But 18 species were found to be represented in the collection. Many others were seen but not captured. The species are doubtless, there as elsewhere, much more abundant in the summer than in the early spring months. The nomenclature of the list is that of Banks' "Catalogue of the Neuropteroid Insects of Temperate North America."*

1. *Calopteryx maculata* Beauv. March 21st; April 1st, common. Ranges throughout the eastern United States.
2. *Lestes forcipata* Ramb. March 7th. Common. New England to Colorado; south to Gulf of Mexico.

* Trans. Amer. Ent. Soc., XIX, 1892.

3. *Lestes sp.?* Three females taken March 6th, 13th and 15th, respectively.
4. *Argia fumipennis* Burm. Frequent along streams and ditches in shady places, March 27th; April 10th. Recorded only from Kentucky, Georgia and Florida.
5. *Argia tibialis* Ramb. With the preceding on April 10th only. Ranges from Michigan to Florida.
6. *Anomalagrion hastatum* Say. Frequent throughout the month of March. Ranges from northern Indiana as far south as Venezuela and the West Indies.
7. *Anax junius* Drury. Common from March 6th on, along the forest roadways. Throughout the United States and Canada.
8. *Gomphæschna furcillata* Say. Frequent after March 30th, along ditches by the side of railway. Recorded heretofore from Massachusetts to Michigan and south to Georgia.
9. *Æschna ingens* Ramb. Common from March 6th on. A species of southern range, recorded only from the Gulf States.
10. *Epiæschna heros* Fab. A single specimen was taken on March 23rd. Ranges throughout the eastern United States.
11. *Tetragoneuria cyanosura* Say. A single specimen was taken in a woodland pathway on March 6th. It occurs throughout the eastern United States.

12. *Tramea carolina* Linn. Very common from March 6th on. Frequents the forest roadways. Ranges from Massachusetts to Florida and the West Indies.
13. *Celithemis eponina* Drury. One male only was taken on March 31st. United States east of the Rocky Mountains.
14. *Libellula axillena* West. Several taken near the end of March. Not common. A species whose range, as far as known, is restricted to the Gulf States.
15. *Libellula auripennis* Burm. Common after March 25th. Atlantic and Gulf States south of New York.
16. *Mesothemis simplicollis* Say. Frequent from March 6th on. Occurs in all the region east of the Rocky Mountains.
17. *Pachydiplax longipennis* Burm. Common after March 11th. Ranges throughout the greater portion of the United States.
18. *Diplacodes minuscula* Ramb. Common from March 7th to April 1st, in forest roadways and pathways, where they hawk close to the ground. Occurs from Kentucky to the Gulf.

A List of the Orthoptera Taken in the Vicinity of Ormond, Florida, in March and April, 1899.

During my stay at Ormond, from March 5th to April 11th, examples of thirty species of Orthoptera were collected. The young of numerous others were seen but not taken. There is little doubt but that as the season advances, the order is as well represented there as in any similar region in the south. Those taken, listed according to Scudder's "Catalogue of the Described Orthoptera of the United States and Canada," were as follows:

1. *Labia burgessi* Scudd. Numerous examples of this small brown earwig were taken from beneath the bark of shrubs and logs on various occasions, from March 5th on. It was described from Palatka, Florida.
2. *Ischnoptera bolliana* Sauss.-Zehnt. A single male of this species was taken March 19th from beneath a pile of weeds along the edge of the Halifax River in the town of Ormond. It has been recorded heretofore only from Texas and New Mexico.
3. *Ischnoptera unicolor* Scudd. This species was common from March 17th on, beneath the bark of pine logs and stumps. Its range includes the greater portion of the United States east of the Rocky Mountains. It is my opinion, based on numerous observations

made in the field, both in Indiana and Florida, that the short-winged species known as *Temnopteryx virginica* Brunn. is the female of *Ischnoptera unicolor.* The two forms are mature at the same time, and are usually found associated together, but I have never seen a female of the long-winged *Ischnoptera* or a male of the form known as *T. virginica.* However, I have never seen the two reputed species *in coitu.*

4. *Ceratinoptera lutea* Sauss.-Zehnt. Several specimens of this small yellow roach were taken on March 10th and later dates from decaying palmetto logs and beneath rubbish along the borders of woodlands. It is a species of the Gulf States.
5. *Eurycotes ingens* Scudd. This large black, ill-smelling blattid was the prevailing roach about Ormond, being very common beneath the bark of logs, stumps and dead trees, as well as beneath rubbish in the woodland. The first mature specimens were taken on March 10th. The young, described by Scudder as *E. sabaliana,* are marked with yellow, which disappears in the mature insect. The species has been recorded by Scudder from various localities in Florida.
6. *Pycnoscelus surinamensis* Linn. Two specimens beneath bunches of hay, March 23rd

and April 4th. Ranges throughout the Gulf and South Atlantic States.

7. *Tettix blatchleyi* Hancock. Two females of a *Tettix* which proved to be new, were secured on March 11th and April 9th, respectively, from damp, sandy places along a roadside, west of Ormond. With the other grouse locusts taken, they were submitted to Dr. J. L. Hancock of Chicago, and by him described.* He states that they belong to the *T. arenosus* series but are distinguished from *arenosus* and allied species by the "slightly more rugose pronotum, more decidedly compressed lateral carinæ, and the compresso-narrowing behind the shoulders of the dorsum." Dr. Hancock states that a specimen from New York, in the collection of the U. S. National Museum, is of the same species.

8. *Paratettix rugosus* Scudd. This was found to be a common species along roadsides and about the borders of marshes in cultivated grounds from March 11th on. It has been recorded from Florida, Nebraska and Old Mexico.

9. *Tettigidea lateralis* Say. This was in company with and even more common than the preceding. Several pairs were taken *in coitu* on March 11th and April 9th. It ranges from

* Tettigidæ of North America, 1902, p. 91.

Florida and the Gulf States north to Central Indiana and west to the Rocky Mountains.

10. *Rhadinotatum brevipenne* Thos. A curious, slender-bodied Acridian, quite common along the borders of woodland paths and old fields on clumps of wire grass. (See ante, p. 150.) It has been recorded heretofore only from Ft. Reed and Orange, Florida.

11. *Eritettix sylvestrus* sp. nov. A medium-sized brown and yellow species, with tegmina only one-third the length of abdomen.

Lateral carinæ of the pronotum moderately arcuate just before the middle. Supplementary carinæ well developed on both head and pronotum, almost as strong as the median carina, and connected with the latter, especially on the head, with numerous small cross carinæ, thus causing that portion of the disk between the supplementary carinæ to be reticulate in appearance. Antennæ with basal half flattened; the apical half gradually tapering. Tegmina aborted; one-third the length of abdomen; inner wings represented by very small and narrow pads.

General color a light wood brown; the outer face of hind femora, grayish brown. A bright yellow line starts from vertex and extends backward to tips of tegmina, covering the space between supplementary carinæ on

head and pronotum. Disk of pronotum, between supplementary and lateral carinæ, darker brown.

Length of body, female, 21 mm.; of antennæ, 6 mm.; of pronotum, 4.5 mm.; of tegmina, 6 mm.; of hind femora, 12.5 mm.

Two females from open pine woods on April 10th.

12. *Macneillia obscura* Scudd. Two examples of this little known species were taken in the open pine woods, three miles west of Ormond, on April 10th. It has heretofore been known only by the four type specimens from Ft. Reed, Florida.

13. *Amblytropidia occidentalis* Sauss. This was a common insect throughout my stay at Ormond, in old fields and deserted orange orchards. The first specimens were taken on March 6th. McNeill gives its range as "the Gulf States north to Tennessee and Georgia and west to Colorado and Arizona."

14. *Arphia granulata* Sauss. This species was also quite frequent and found in the same localities as the preceding. Mature specimens were taken March 6th, and it may be possible that it winters in the adult stage. It has been recorded heretofore from Florida and Nebraska.

15. *Chortophaga viridifasciata* De Geer. Common after March 7th, on grassy slopes in old fields and orchards. The median carina of pronotum is higher and the mottling of green and fuscous much more pronounced than in northern specimens. Its range includes the United States east of the Rocky Mountains.
16. *Scirtettica picta* Scudd. This handsome species occurs sparingly on bare sandy places in old fields and roads. It was described from Florida and has been taken at several points in the State.
17. *Psinidia fenestralis* Serv. This is also a sand loving species and was frequently taken in company with the preceding after March 7th. It ranges over the entire eastern United States.
18. *Trimerotropis citrina* Scudd. One female was taken on March 12th, from a sandy roadside. No others were seen. Its range is given by Scudder as Manitoba to Texas.
19. *Dictyophorus reticulatus* Thunb. The nymphs of this lubber locust were abundant on weeds along roadsides and pathways, after March 20th. It probably reaches maturity at Ormond about May 1st.
20. *Schistorcerca americana* Drury. Quite frequent in old orchards and gardens throughout my stay. Its range covers the United States east of the Great Plains.

21. *Schistocerca damnifica* Sauss. With the preceding and more common after March 11th. It occurs from Pennsylvania and Illinois southward.

22. *Melanoplus propinquus* McNeill. The males of this, the southern representative of the northern *M. femur-rubrum,* made their first appearance on March 16th; the females on March 25th. They became common by April 5th, frequenting grassy slopes free from underbrush. It is so far known only from Florida.

23. *Paroxya atlantica* Scudd. Numerous examples of this trim-bodied species were secured on April 3rd and dates thereafter in a clearing in the low hammock region west of Ormond. It occurs near the coast in Georgia and Florida.

24. *Aptenopedes sphenarioides* Scudd. Frequent from March 7th on, in old orange orchards and cultivated grounds. It has heretofore been recorded only from Ft. Reed and Jacksonville, Florida.

25. *Conocephalus nietoi* Sauss. Four females, three green, one brown, were taken from a species of tall grass in orchards and clearings on March 16th and April 2nd. Heretofore it has been known only from Texas and Louisiana.

26. *Atlanticus pachymerus* Burm. Several nymphs of this locustid were secured on March 26th.
27. *Gryllotalpa borealis* Burm. A specimen was brought me by a negro on March 20th. He stated that it is very common about the borders of low, cultivated fields, and his statement is borne out by the number of runways I noted.
28. *Ellipes minuta* Scudd. On March 30th this little burrowing cricket was found in numbers, in company with the grouse locusts (Tettiginæ) in a low spot in the corner of a cultivated hammock. It occurs from Minnesota to the Gulf.
29. *Nemobius ambitiosus* Scudd. This handsome little ground cricket was common in open places along the forest roadways during March and April. It was described from Ft. Reed, Florida, and I can find no other record of its occurrence.
30. *Gryllus pennsylvanicus* Burm. This was the only field cricket seen. It was plentiful beneath rubbish in open and cultivated grounds.

A List of the Hemiptera-Heteroptera Taken in the Vicinity of Ormond, Florida, in March and April, 1899.

The true bugs do not seem to be plentiful in East Florida in the early spring months. Representatives of but twenty species were taken during my stay there. These, identified and listed according to Uhler's "Check List of the Hemiptera-Heteroptera of North America," are as follows:

1. *Corimelæna atra* Am. et S. Several specimens were secured from beneath rubbish on April 2nd. Its range covers the entire United States.
2. *Pangæus bilineatus* Say. One specimen, March 25th, from beneath a log. It also is a species of wide range, but is less common than the preceding.
3. *Stiretrus anchorago* Fab. A single example was taken April 3rd, on flowers of a Senecio. While usually accredited to the Southern States, it has been taken as far north as southern Indiana, where it occurs in small numbers.
4. *Euchistus servus* Say. Several specimens of this common species were taken from oak leaves on April 2nd, and on dates thereafter.
5. *Euchistus variolarius* Pal. Beauv. One from a leaf of thistle, on March 24th. It also is a species of wide distribution.

6. *Thyanta custator* Fab. One, March 13th, from bracts of thistle. Ranges over the entire United States, but in my experience is nowhere common.
7. *Euthoctha galeator* Fab. Several specimens were taken from flowers of Senecio, etc., on March 22nd and later dates. It also occurs throughout the United States.
8. *Metapodius femoratus* Fab. From leaves of orange trees and other shrubs, on several occasions from April 2nd on. South Atlantic and Gulf States.
9. *Leptoglossus phyllopus* Linn. On several occasions from March 13th onward. It has the same range as the preceding.
10. *Margus inornatus* Stal. Two, April 4th, from flowers of thistle. One, April 9th, from those of Senecio. Not before recorded north of Mexico.
11. *Alydus pilosulus* H. Schf. One, April 4th, from sandy bank along railway. Occurs throughout the eastern United States.
12. *Harmostes reflexulus* Say. One, April 2nd, from beneath a pine log. Recorded by Uhler from the Western States. Frequent in Indiana.
13. *Melanocoryphus bicrucis* Say. Common after March 24th, on flowers of Senecio and other

plants. Occurs throughout the Southern States.

14. *Atrachelus cinereus* Fab. One, March 30th, from leaf of oak shrub. It is also a species of southern range.
15. *Zelus bilobus* Say. One, April 9th, from a leaf of the saw palmetto. Its known range is also limited to the south Atlantic and Gulf States.
16. *Zelus cervicalis* Stal. One, April 2nd, from flower of the Senecio. Its range is the same as that of the previous species.
17. *Hammatocerus purcis* Drury. Only nymphs of this handsome bug were taken. While its general range is southern, it occurs as far north as Crawford County, Indiana.
18. *Rasahus biguttatus* Say. One, April 10th, from beneath a log. Uhler accredits it to the Western States.
19. *Melanolestes picipes* H. Schf. Several specimens were taken on different dates from beneath logs and rubbish. It appears to be common throughout the eastern United States and, a few years ago, gained quite a reputation as the "kissing bug."
20. *Salda pallipes* Fab. Two from beneath logs in damp sand, March 21st. It is also accredited by Uhler to the "Western States."

A List of the Butterflies Taken in the Vicinity of Ormond, Florida, in March and April, 1899.

I left Ormond on April 11th, before many of the spring forms of butterflies had changed from the larval and chrysalis stages in which they pass the dryer months. The species of Thecla and Pamphila, which comprise a large portion of the butterfly fauna of any region, were just beginning to appear, and many others, doubtless belated by the frosts and cold days of that season, were being called into active imago life, just about the time I was leaving. As a consequence, representatives of only 27 species were taken, though a number of others were seen but not captured. To Dr. Henry Skinner, of Philadelphia, I am under obligations for verifying the species of *Nisoniades* and several other of the smaller forms. Those taken were as follows:

1. *Papilio ajax floridensis* Holland. The Zebra Swallow-tail. Quite frequent in the more open forests after March 15th. This form is said by Holland to be "prevalent in the spring on the St. John's River."
2. *Papilio troilus* L. The Green-clouded Swallow-tail. Common from March 6th on, about flowers in the yards, and along the roadsides. Ranges throughout the Atlantic and Gulf States and Mississippi Valley.
3. *Papilio palamedes* Drury. The Southern Swal-

low-tail. This was by far the most common Papilio about Ormond. On all warm sunshiny days, when the wind did not blow too strongly, it was abundant about the yards and gardens of the town; along the roadways and in the forest glades; winging its way from clump to clump of spring flowers, or courting coquettishly in the air. The first specimen was seen on March 8th. It ranges from southern Virginia to South Florida, and westward to southern Missouri and Texas.

4. *Papilio turnus* Linn. The Tiger Swallow-tail. Several specimens were seen from March 6th on, but it was at no time as common as in Indiana at a corresponding season. Ranges over the entire eastern United States.
5. *Papilio cresphontes* Cram. The Giant Swallow-tail. This species was noted from March 6th on, though but few specimens were seen, and they were all smaller than the average northern example. However, it is said to be quite common later in the season; the caterpillar, known as the "Orange-puppy," at times doing much damage to the foliage of orange trees. While generally southern in its range it has been taken in northern Indiana and even in Ontario.
6. *Callidryas eubule* L. The Cloudless Sulphur. Began to emerge on March 11th, and was

quite common thereafter in the old orange orchard and about the flowers of the shrubby buckeye, *Æsculus pavia* L. Ranges from New England and Wisconsin to Patagonia and west as far as southern California.

7. *Colias cæsonia* Stoll. The Dog's Head Butterfly. One, April 10th, from open pine woods. Ranges from central Indiana south and southwest to Orizaba, Mexico.
8. *Agraulis vanillæ* L. The Gulf Fritillary. This species was rather common from March 6th on, in forest roadways and old deserted orange groves. Its range is from Virginia southwest to Old Mexico, and north as far as southern Indiana.
9. *Phyciodes phaon* Edw. The Gulf Crescent. A single specimen was secured on April 3rd. Its known range is limited to the Gulf States and Kansas.
10. *Pyrameis atalanta* L. The Red Admiral. This showy species was seen on various occasions after March 14th. Its range is the entire United States, it having been probably introduced from Europe, where it is also common.
11. *Pyrameis huntera* Fab. The Painted Beauty. Several were seen on April 4th and dates thereafter, in old fields and along the railway. It also ranges over the entire United States.

12. *Junonia cœnia* Hub. The Buckeye. A few worn specimens were seen on March 7th and later dates. They were probably those of a fall brood which had hibernated. The species ranges across the continent but is found in numbers only southward.

13. *Neonympha gemma* Hub. The Gemmed Brown. This modest mouse gray butterfly was taken in small numbers on March 22nd and once or twice thereafter, but was much less common than its companion species. Like them it frequents woodland paths and roadsides, and is seldom seen in open, sunny places, where most other butterflies delight to wander. It is a southern form, ranging through the Coast and Gulf States from West Virginia to Mexico.

14. *Neonympha eurytus* Fab. The Wood Nymph. This species was first seen on March 20th. It soon became very common, and more of them were taken than of any other butterfly. Its range covers the eastern United States as far as the Rocky Mountains.

15. *Neonympha sosybius* Fab. The Carolinian Satyr. This, the smallest of the three Neonymphas taken, was common throughout my stay at Ormond, having been first noted on March 6th. Its range is from New Jersey southward to Central America.

16. *Calephelis cœnius* L. The Little Metal Mark. This little reddish brown species was rather common about cultivated flowers from April 2nd on. Its range is from Virginia south and west to Texas.
17. *Thecla pœas* Hub. The Least Purple Hair Streak. This was the only member of the genus taken, though others were seen which escaped the net. A single specimen was taken from the flowers of Senecio on April 3rd. It ranges from the Gulf as far north as Indiana and West Virginia.
18. *Pamphila zabulon* Bd.-Lec. The Mormon. This species was first seen on March 17th. It is evidently in Florida, as in Indiana, one of the first, if not the first Pamphila to reach maturity. It and its varieties range throughout the Mississippi Valley from Canada to the Gulf.
19. *Pamphila maculata* Edw. The Twin-spot. A single example was captured on April 4th. It is a southern species which is occasionally found as far north as New York.
20. *Nisoniades icelus* Lint. The Dreamy Dusky-wing. Several were taken on March 27th and dates thereafter. Its range includes almost the entire United States.
21. *Nisoniades somnus* Lint. The Dark Dusky-wing. This is a closely allied species to the

preceding, and may be only a larger southern form. It was taken in small numbers from March 23rd on. Heretofore it has been known only from the Indian River, 140 miles farther south.

22. *Nisoniades nævius* Lint. Nævius' Dusky-wing. This species was first taken on March 12th, and occasionally thereafter. It, too, has been taken before only on the Indian River.

23. *Nisoniades juvenalis* Fab. Juvenal's Dusky-wing. A few specimens were secured on March 23rd. Its range is over the greater part of the eastern United States. The habits of these four species of Nisoniades are essentially the same. They frequent the borders of woodland paths and sandy roadways; seldom rise more than a foot above the earth, and when disturbed, move in a strong and rapid flight a rod or two distant and then alight.

24. *Pholisura hayhurstii* Edw. The Southern Sooty-wing. This little species was frequent in damp, sandy places along roadsides from March 23rd on. Its range is over the southern half of the eastern United States as far north as central Indiana.

25. *Eudamus pylades* Scudd. The Northern Dusky-wing. This was a common species throughout my stay at Ormond, having been

noted the first day I arrived. It frequents gardens and the borders of roadways. Its range includes Canada and the eastern United States.

26. *Eudamus tityrus* Fab. The Silver-spot. Frequent about yards and orchards from March 25th on. Its range includes the whole United States.

27. *Eudamus proteus* L. The Long-tailed Skipper. This species was also first seen on March 25th, and became common before I left. It frequents roadsides and cultivated grounds, and ranges from New York south and southwest to Central America.

A List of the Coleoptera Taken in the Vicinity of Ormond, Florida, in March and April, 1899.

As already noted, p. 51, the number of species of mature Coleoptera about Ormond in the early spring months is limited. Representatives of but fifty-five were secured. These are listed herewith according to the nomenclature of Henshaw's "List of the Coleoptera of America North of Mexico." Species preceded by an asterisk are not included in Schwarz's "Coleoptera of Florida."* Thanks are due Mr. H. F. Wickham, of Iowa City, Iowa, for aid in determining and verifying the species taken.

* Proc. Amer. Philos. Soc., 1878, p. 353 et. seq.

1. *Cicindela unicolor* Dej. But two specimens taken, a male on March 12th and a female, April 10th. Both from sandy pathways in the woods.
2. **Calosoma scrutator* Fab. Two from borders of woods, crawling on the ground—April 1st and April 4th.
3. *Pasimachus marginatus* Fab. Two on March 24th from beneath logs in the open pine woods.
4. *Pasimachus subsulcatus* Say. Four from beneath a chunk on April 6th.
5. *Scarites subterraneus* Fab. One from beneath log.
6. *Morio monilicornis* Lat. Frequent beneath bark of pine logs and snags; March 15th, 17th, 25th.
7. **Pterostichus submarginatus* Say. Two from beneath bark of pine logs. One, March 24th, immature; the other April 8th. Dr. Schwarz lists but one species, viz., *P. acutangulus* Chal., of this genus from the State. Twenty-three have been taken by me in Indiana; showing that the genus is one of northern range.
8. **Diplochila laticollis* Lec. One specimen on March 17th from beneath bark. Both Dr. Schwarz and Dr. Hamilton list the variety *D. major* Lec.

9. **Helluomorpha ferruginea* Lec. Six were secured beneath a pine log in the open woods on March 24th.
10. **Anisodactylus rusticus* Dej. One beneath a log on April 1st.
11. **Anisodactylus terminatus* Say. Several, on March 24th and April 1st, from beneath bark of logs.
12. *Staphylinus tomentosus* Grav. One, March 17th, from beneath bark.
13. *Belonuchus formosus* Grav. One, April 2nd, from beneath bark.
14. *Bledius basalis* Lec. Several, April 2nd, from a fungus.
15. *Languria marginipennis* Sz. A number on April 2nd, from the flowers of a *Senecio*.
16. **Penthelispa hæmatodes* Fab. One, March 25th, from beneath pine bark.
17. *Hister sp.?* Several, March 6th, from beneath pine bark.
18. *Hister sp.?* One, March 16th, from beneath pine bark.
19. *Tenebrioides semicylindrica* Horn. One, April 1st, from beneath a chunk.
20. **Adelocera discoidea* Web. One, March 25th, from beneath bark.
21. *Alaus myops* Fab. Common on various dates from beneath bark.
22. *Dicera lurida* Fab. One, March 25th, from beneath bark.

23. *Chauliognathus marginatus* Fab. Common April 2nd, on flowers of *Senecio.*
24. *Polemius sp.?* One, April 2nd, on flowers of *Senecio.*
25. *Polemius sp.?* One, April 10th, on flowers of *Senecio.*
26. **Canthon lævis* Drury. One, April 1st, from horse manure. Dr. Schwarz lists five species, but this is not among them.
27. *Phanœus carnifex* Linn. One, April 4th, from effete matter.
28. *Phanœus igneus* MacL. On several occasions, from March 17th on, from horse dung. Varies much in color.
29. *Diplotaxis languida* Lec. Two, April 1st, from leaves of scrub oak.
30. *Orthosoma brunneum* Forst. One, April 10th, from the leaf of a shrub. The punctations on head, thorax and elytra are noticeably fewer and smaller than in northern specimens; the surface is, therefore, much smoother.
31. *Lema ephippiata* Lac. A single specimen was taken April 4th, from the blossom of a thistle.
32. **Bassareus croceipennis* Lec. One, April 2nd, from flowers of *Senecio.* Listed from Lake Worth, Florida, by Dr. Hamilton.
33. **Bassareus lituratus* Fab. One, March 25th, from leaf of saw palmetto.

34. *Cryptocephalus guttulatus* Oliv. One, April 1st, from leaf of oak shrub.
35. *Cryptocephalus bivius* Newm. One, April 1st, from leaf of oak.
36. **Disonycha glabrata* Fabr. One, April 2nd, from leaf of oak shrub.
37. *Porphyraspis cyanea* Say. Several on March 26th, on leaves of saw palmetto.
38. *Coptocycla guttata* Oliv. One, March 27th, from leaf of oak shrub.
39. **Chelymorpha argus* Licht. One, March 26th, from leaf of oak shrub. Smaller and black spots less prominent than in northern specimens.
40. *Polypleurus nitidus* Lec. One, March 29th, beneath log in pine barren.
41. *Nyctobates pennsylvanica* DeG. Frequent beneath bark of pine and other logs.
42. *Nyctobates barbata* Knoch. Frequent with the preceding.
43. **Opatrinus aciculatus* Lec. One, March 17th, from beneath a chunk.
44. *Tharsus seditiosus* Lec. One, March 25th, from beneath pine bark.
45. **Uloma imberbis* Lec. One, March 17th, beneath a log.
46. *Uloma punctulata* Lec. Common, March 17th, and other dates beneath bark of dead pines.
47. *Platydema erythrocerum* Lap. One March 25th, beneath bark of pine log.

48. *Platydema flavipes* Fab. One, with the preceding.
49. *Arthromacra gagatina* Melsh. Three, one pair in copulation, March 22nd, from beneath bark of pine logs.
50. **Eustrophus tomentosus* Say. One, March 25th, from beneath log.
51. *Attelabus analis* Ill. One, March 28th, from leaf of oak.
52. *Notolomus basalis* Lec. Several, March 13th, on flowers of thistle.
53. *Chalcodermus collaris* Horn. One, March 13th, beneath board.
54. *Centrinus sp.?* One, March 23rd, from flower of thistle.
55. *Sphenophorus sculptilis* Uhl. One, March 15th, from beneath log.

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